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"NEC TEMERE—NEC TIMIDE."

THE
NATURALIST:
JOURNAL OF THE WEST RIDING CONSOLIDATED
NATURALISTS' SOCIETY,
AND
GENERAL FIELD CLUB RECORD.

NEW SERIES.

EDITED BY CHAS. P. HOBKIRK AND G. T. PORRITT, F.L.S.



VOL. I., 1875-6.

HUDDERSFIELD:

B. BROWN, PRINTER AND STATIONER, MARKET PLACE CORNER.

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No. I.

AUGUST, 1875.

VOL. I.

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HUDDERSFIELD:

B: BROWN, MARKET PLACE CORNER.

TO CORRESPONDENTS.

The Editors will esteem it a favor, if the Secretaries of Field Clubs and Naturalists' Societies throughout the Kingdom will favor them with occasional Notes of their proceedings and Excursions, when of interest.

Papers read at Meetings of these Societies, or otherwise, on any branch of Natural History, will be gladly received and inserted in full, if of sufficient general interest, or in abstract, if of only local interest.

All communications, except Advertisements, Exchanges, or Short Queries, should, if possible, be in the hands of the Editors not later than the 18th of the current month, to insure insertion in our next issue, and should be written on one side of the sheet only.

N.B.—The Editors cannot undertake to return rejected papers, unless accompanied by a stamped addressed cover.

Natural History advertisements inserted on liberal terms.

All communications must be addressed to the Editors, care of Mr. B. BROWN, Publisher, Huddersfield.

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THE NATURALIST.

ADDRESS.

IN issuing our first number to Naturalists and Naturalists' Societies, it is perhaps necessary that some few words should be offered for our *raison d'etre*.

Ever since the untimely decease of the Journal published in this district, which appeared for three years (1865-6-7), under the somewhat general title of "THE NATURALIST," a want has been felt in Yorkshire for a similar publication, for the purpose of recording the observations of amateur naturalists and local Societies. This want, which had been growing for some years, was recently attempted to be supplied by a journal issued by a member of one of our local Natural History Societies—that of Wakefield—which took the title of the "NATURALISTS' RECORDER." This, however, owing to a variety of causes, had but a short-lived existence. The Societies in the Union of the West Riding Consolidated Naturalists' Society then took the matter into serious consideration at several of their recent meetings, with a view to again attempting to meet the want felt by all our members; and at the meeting held at Rastrick, near Huddersfield, on 12th June, a prospectus was submitted, and finally agreed to, as the basis of a new Journal, "THE YORKSHIRE NATURALIST," which thus makes its first appearance to-day, under our editorship.

Its principal object is, then, to afford a means of communication amongst all Natural History Societies, either within or outside the boundaries of the County of York, and of every individual member of such Societies: and we shall also be only too glad to see the names of other gentlemen not connected with such Societies, as contributors to our pages.

In carrying out this object, we shall be glad to receive papers on any branch of Natural History, either in elucidation of any disputed point, or other question arising in the minds of our contributors, which they may deem useful to be communicated ; also Reports of Meetings, Excursions of Societies, or of any members of them ; lists of local *fauna* or *flora*, or of additional species to already published lists ; short notes on any particular species, or capture in any part of the United Kingdom ; Notes and Queries, as correspondence amongst our supporters on any Natural History subject that may interest them. Offers of exchange in all branches will also form a part of our plan—though, whilst at present undecided whether these shall be inserted free of charge, we shall at first so insert them, leaving ourselves free at any future time, to make a small charge for their insertion.

In conclusion, we here make an earnest appeal to all Naturalists for their support, both by way of subscriptions and contributions. The price of each number is so small that all can afford it, and we are equally sure that all can occasionally contribute some matter of interest to its pages. Whilst reserving to ourselves a discretionary power of curtailing, or even of rejecting, communications—as we are in duty bound,—yet we can conscientiously promise that every communication that may be sent shall have our careful attention and consideration, and we shall certainly use the knife sparingly, and be merciful according to our power. Let none, therefore, withhold their information. There is nothing succeeds like success ; and to ensure this success we need but one thing—and that is, the cordial support of all Naturalists. Let this be fully given, and no labour on our part shall be wanting to make “THE YORKSHIRE NATURALIST” a permanent institution.

Since the above was in type, we have received many letters suggesting that we should adopt a title somewhat wider in its scope ; agreeably with these suggestions, and also with a resolution passed at the last meeting of the Consolidated Societies, the title of this journal will be simply “THE NATURALIST.” We hope this will meet the views of all our friends.

Original Articles.

OCCURRENCE OF THE NIGHTINGALE NEAR HUDDERSFIELD.

To persons in this locality it may seem almost unnecessary to write anything more about the Nightingale which visited Mollicar Wood, near Farnley Tyas, this spring, but it was thought desirable to have some account of it in the first number of this journal.

According to several persons who live near the above wood, the notes of this charming songster were first heard on the night of May 5th. During the first fortnight after its arrival, the Nightingale frequented various parts of the wood, in which to pour forth its melodious strains, and when disturbed by the too near approach of listeners, it frequently flew unnoticed and in silence to resume its song at a little distance. After that time it located itself each night in the same bush, which was ten or twelve feet high. It usually began its song about ten o'clock, and sung until daybreak, and was also occasionally heard and seen, along with its mate, in the daytime, by those living in the vicinity of Mollicar Wood.

I heard this Nightingale on three different nights, and once I crept under the bush where it was singing, but owing to the thickness of the foliage, could not see it, till it fluttered from one side of the bush to the other. I heard it for the last time between twelve and one o'clock on the night of June 2nd, remaining after numbers of people had left the place; then, when all was quiet, its song burst forth with even more fulness and fewer pauses than before. It was last heard to sing on the night of June 6th.

Various rumours and suppositions are afloat concerning the sudden disappearance of this Nightingale, but, as yet, nothing satisfactory has been ascertained as to its fate. Its nest has been searched for by some, but I believe it has not been found. Great numbers of people have been to hear this splendid songster, its notes being quite new to them, for the Nightingale has not been heard in this district for twenty-five or thirty years.

July 2nd, 1875.

J. E. PALMER, Huddersfield.

[We should be glad of any authentic information as to the fate of this bird, and whether any of the rumours are correct.—EDS. NAT.]

INHERITED INSTINCT.

IN the *Contemporary Review* for July, there is an article by the Duke of Argyle, on "Animal Instinct, and its relation to the mind of Man," in which he cites two or three instances of what is called inherited instinct which are worth recording, although we do not altogether agree with His Grace's conclusions thereon. One of these relates to the Dipper, or water ouzel (*Cinclus aquaticus*), the curious habits of diving of which are well known to ornithologists. He says, "A pair of these birds built their nest last year at Inverary, in a hole in the wall of a small tunnel, constructed to carry a rivulet under the walks of a pleasure ground. The season was one of great drought, and the rivulet during the whole time of incubation and of the growth of the young in the nest, was entirely dry. One of the nestlings when almost fully fledged was taken out by hand for examination, an operation which so alarmed the others, that they darted out of the hole, and ran and fluttered down the tunnel towards its mouth. At that point a considerable pool of water had survived the drought, and lay in the path of the fugitives. They did not appear to seek it: on the contrary, their flight seemed to be as aimless as that of any other fledgling would have been in the same predicament. But one of them stumbled into the pool. The effect was most curious. When the young bird touched the water, there was a moment's pause, as if the creature were surprised. Then instantly there seemed to awake within it the sense of its hereditary powers. Down it dived with all the facility of its parents, and the action of the wings under the water was a beautiful exhibition of the double adaptation to progression in two very different elements, which is peculiar to the wings of most of the diving birds. The young Dipper was immediately lost to sight among some weeds, and so long did it remain under water, that I feared it must be drowned, but in due time it reappeared all right, and being recaptured, was replaced in the nest.....There was no possibility of imitation here. The rivulet beneath the nest, even if it had been visible, had been dry ever since they had been hatched. The river into which it flowed was out of sight. The young Dippers never could have seen the parent birds either swimming or diving. This, therefore, is one of the thousand cases which have driven the "experience" school of philosophy to take up new ground: "it is truly a case of inherited instinct.

ON THE STUDY OF THE LARVÆ OF LEPIDOPTERA.

By G. T. PORRITT, F.L.S.

I SHOULD like to write a few words to our Yorkshire lepidopterists, on the advisability of paying more attention than they have hitherto done to the earlier, and more particularly to the larval stages of our lepidoptera. There is now comparatively little scope so far as the imagos of our macro-lepidoptera are concerned, as we are tolerably well acquainted with them; and fresh species turn up so sparingly, that one may work on and on for year after year without meeting with one. In the larvæ this is very different, for although very rapid strides have been made during the last few years, chiefly through the instrumentality of Messrs. Buckler, Hellins, and a few others, the larvæ of a good number of our commonest moths are still amongst the "unknown." And even amongst those that have been discovered, what a large number there are totally unknown except to but a few entomologists. How many of our Yorkshire lepidopterists, for instance, are thoroughly acquainted with the larvæ of such abundant species as *Pieris napi*, *Asthena candidata*, *Acidalia bisetata*, *scutulata* and *remutata*, *Emmelesia decolorata* and *albulata*, *Melanippe montanata* and *fluctuata*, *Leucania impura* and *pallens*, *Hydrcia nictitans* and *micacea*, *Xylophasia lithoxylea* as distinct from that of *polyodon*, *Luperina testacea*, *Apamea oculea*, *Miana strigilis*, and hosts of others? We have spent so much time feeding up *Bombyces*, and showy and easily obtainable things, that other, quite as common, but more obscure species have been completely lost sight of.

It is no doubt quite true that many very common larvæ are exceedingly difficult to find, and even when found, are still more difficult to keep alive, but this ought to make us more anxious to get at their history. Since the old, and formerly considered almost insuperable difficulty of preserving the natural colours of larvæ, is now, happily, to a great extent done away with, it is very pleasing to note how rapidly, during the last three or four years, the desire to have the larva along with the imago in our cabinets has grown amongst lepidopterists, and we have every reason to congratulate ourselves that one of our own entomologists, and a member of our West Riding Society (Mr. S. L. Mosley), was one of the first to do this as perfectly as anyone had previously succeeded. This will doubtless, bring the study of larvæ much more prominently before lepidopterists than would otherwise have been the case, so that I trust we can now

confidently hope that in a few years we shall know most larvæ at sight almost as well as the imagos. To ensure this we have only to work, and to do this thoroughly we shall often have to put up with no little annoyance and trouble.

Every strange larva we come across ought to be at once "described" to the best of our ability (of course it will require considerable practice to do this satisfactorily), and then kept separate, labelled with the date of its description, &c., to await the appearance of the imago from it. If more than one or two are found, one (one of each variety, should it be a variable larva) ought to be preserved; or if the captor be a good draughtsman, its portrait should at once be taken.

Another, and more satisfactory, way is, to obtain eggs from captured moths, and then feed-up the larvæ. Many species deposit readily enough in chip-boxes, and others are easily "coaxed" by putting bits of the food (or suspected food, if it be not known) into the boxes. Some, however, are very difficult to manage, and all sorts of schemes have to be devised to get them to part with their eggs; whilst many—such as the root-feeding *Noctuæ*, a large number of the *Pyrales*, &c.—have thus far baffled lepidopterists altogether; but even these patience will no doubt gradually bring to light.

I could write a good deal more on this subject, but I have, I trust, said sufficient to induce at any rate a few to "go in" for this exceedingly interesting part of the study of lepidoptera.

Huddersfield, July 3rd, 1875.

Since writing the foregoing, Lord Walsingham has sent me several species of larvæ, preserved by himself, which, being mounted on artificial leaves of the food-plant in their natural positions, are much more effective than any I have previously seen. They clearly show what rapid strides this branch of our favourite science is making.—

G. T. P.

THE LATE MR. HENRY DOUBLEDAY.

Every lepidopterist, not only in Britain, but throughout the continent of Europe, will learn with intense regret of the death of Mr. Henry Doubleday, of Epping, which event took place on the 29th of June last. Had he survived three more days, he would have been sixty-seven years of age. For a great many years he had been justly considered the highest authority in Britain, in the

special department which he had made almost a life study ; and so great was his knowledge in it, that for years lepidopterists were very loth to admit any fresh species of moth or butterfly into the British list that had not been first submitted to him ; but his judgment having been passed upon it, it was equally rare that the faintest doubt was expressed towards the correctness of his decision. He was an old correspondent of mine, as indeed he was of a great number of lepidopterists, for a friendship once formed with him was rarely, probably never, broken off. His kindness and unassuming manner, even to those who were the merest children in the science of entomology, won the heart of every one with whom he came in contact. He had been ailing for some time, and was evidently well aware of his fast-failing strength, as the last letter I received from him (dated June 2nd, 1875) evidently shows. After acknowledging some larvæ of *Pterophorus rhododactylus* which I had sent him, he wrote that he had been exceedingly anxious about a cousin who had lived with him, during a very severe illness, from which she had just recovered. He then says : "Whether from over-anxiety or some other cause, I cannot tell, but about a month ago I was suddenly taken ill with an affection of the heart, and congestion of the upper portion of the lungs, and I have suffered terribly ever since. The difficulty of breathing and constant fear of suffocation, are really worse to bear than pain. I have been unable to do anything, which is a great trial to me, as I spend so much of my time in the garden looking after my plants. I am almost afraid I shall never again be able to do as I have done," &c., &c. He is gone, but has left behind him a memory beloved by every one. Men like him are scarce in these days, and entomology can ill spare such a one.

GEO. T. PORRITT.

IS THERE SUCH A THING AS A SPECIES ?

By CHAS. P. HOBKIRK, V. P. Huddersfield Naturalists' Society.

[The following remarks are the matter of a Paper read before the Huddersfield Naturalists' Society, in May, 1875, and were called forth by a discussion at a previous meeting, in which one of the members stated certain opinions with which I could in no sense agree.]

These opinions were somewhat to the following effect : that species are not mere arbitrary things, ranked together for the purpose of classification, but that they are real natural entities, that they can be

readily distinguished and defined ; that hard and fast lines of distinction and definition can be made, which are true and exact in every particular, and are thus the true exponents of Nature.

To all these statements I fearlessly and strongly give a complete denial, inasmuch as they are not the true expression of what we find in Nature. I must, then, attempt to make it clear to you why I dissent from these opinions, which after all were, until very recent years, accepted as correct.

So long ago as 1864, M. A. Jordan, of Lyons, a French botanist of no mean repute, published a work, the English translation of the title of which is " Diagnosis of New or Misunderstood Species," in which he endeavoured to show—and with some fair reasoning, too—that an immense number of what had hitherto been considered good species of plants, after the Linnean type, were in reality not species, but groups of species. In the preface to this work (p. 7) he states " that all his proposed new species are really nothing more than certain vegetable forms " (previously united under one specific name) " which he had learned to distinguish from the others by comparisons on the living plants, of *all* their organs " ; and he had established, by most certain observations, that their differences were hereditary, and could not be attributed to accidental or local causes. And this, he says, is true of the vast majority of our species. He further states that he has arrived at these conclusions only after a course of study and experiment, extending over twenty-five years, during which time he has grown and re-grown the various forms which he terms species, without ever finding them either to intermix or revert to what might be called their original type. With M. Jordan, every slight difference, if reproduced by seed during a number of years, such as say the hairiness or otherwise of a leaf, a slight difference in the size or shape of a seed-vessel, or a leaf of the calyx, and so forth, is sufficient to constitute a species. In this manner he makes out of our usually accepted *Anemone pulsatilla* four species ; of *Ran. acris* he makes six species (one of which, *R. tomophyllus*, seems really a good one) ; of *Papaver Rhœas* he makes eight, of *Arabis hirsuta* he makes twelve, and of *Draba verna* 53. But few of these so-called species were ever recognised at all by other botanists, and what few were recognised were merely held as varieties.

This is Jordan's idea of a species, and a most comprehensive one it is. He belongs to the school called " splitters," and he is a " splitter " of a most advanced type !

In the " Naturalist " for 1865, M. F. Crèpin, a Belgian botanist,

and a correspondent and friend of mine, published a review of this book, in which he criticised it most freely, and in which he says that he cannot accept Jordan's idea of a species. He believes his criterion to be defective, and that in a great number of cases he has been content with analogies ; that he has inferred the general from the particular—a method which frequently leads to error. It remains now to decide (says Crèpin)—and this is the chief point in the discussion—whether the modern school, of which Jordan is the exponent, by means of its criterion, has indicated the true unity or species. “If such be the case, we (Linneans) must acknowledge that what we have taken for species are in reality generic groups, and that true species are infinitely more numerous than we had supposed, that their affinities are in general very close, and that they are only distinguished from one another by very slight and not easily found differences.” It will be observed that Crèpin here calls himself a Linnean, which, to him, signifies a position intermediate between the “splitters” on the one side, of the Jordanic school, and the “lumpers” on the other side, or the school of Bentham, Cosson, and Germain. At the same time, while finding fault with Jordan for splitting up recognised species, he equally censures Bentham and the others for lumping together forms which he considers sufficiently distinct.

I have been led into these particulars with a view of strengthening the position advocated by Mr. Moseley, in his paper on “Species v. Variety,” that there is no real definition amongst botanists any more than amongst entomologists as to what constitutes a species, and what a variety.

(To be continued.)

Short Notes and Queries.

CONCHOLOGICAL NOTES. — The Huddersfield District has been so well worked during the last ten years, that there is but little new to record for the last twelve months ; some of the old forms have been found in new localities—e. g., *Zonites excavata*, and var. *vitrina*, having been found in Hey-

Wood, near Honley, on the 27th March last, where the *var.* appears to be more plentiful than the type. The animal and shell have been so well described by Jeffreys and others, that I need not say anything on that part of the subject. I have also to record that Mr. Jackson and myself found, for the first time in the “consolidated” district, on the 29th of March last,

at Netherton, near Bretton Hall, var. *crystallina* of *Cochlicopa tridens*. The finding of this shell shows that every member who can, ought to make a point of attending the meetings of the Consolidated Society; as, but for the meeting at High Hoyland, this shell might never have been included in the fauna of the district. Perhaps it would have been better if the shell had not been found, as I have been informed that the place is now something like a ploughed field, and if so, some of our so-called Naturalists have a great deal to answer for. But to return to *Cochlicopa tridens*. I find that when the type and var. are found together, the type appears to be of an intermediate character as to colour, being white about one-sixteenth of an inch from the spire end. I shall be glad to know if other conchologists have observed the same thing.—JNO. CONACHER, JUN.

Huddersfield, July, 1875.

DICRANUM MONTANUM in Scotland. The Rev. J. Fergusson announces, in the "SCOTTISH NATURALIST" for July, that he has found this rare moss in Craighall Den, near Blairgowrie. This is the first time this moss has been found in Scotland, and it is only the second locality for it in the British Islands, having been first found by Mr. Jas. Bagnall on the trunk of an oak in Sutton Park, near Birmingham. One of its principal distinguishing characters is, its having the margin of the leaf sharply and distinctly denticulate above, and the nerve at the back and near the apex is similarly toothed.

A PAIR of tomtits have brought off a nest of twelve young ones, which they have actually hatched and reared under the burner of one of the public pillar lamps in the busiest part of High Street, Ashford.—*Chatham News*.

LARUS RIDIBUNDUS.—I have to record the capture of a pair Black-headed Gulls (*Larus ridibundus*)—male and female—on the 3rd of this month, at South Kirkby, about seven miles from here. They were in full breeding plumage. Their occurrence at this season, so far from their usual haunts, is rather singular.—WM. JAS. COPE.

Barnsley, June, 1875.

A NEW BRITISH CAREX.—In the "JOURNAL OF BOTANY" for July, Dr. H. Trimen, F.L.S., of the British Museum, describes and figures a new species, *Carex ornithopoda*, found by Messrs. John Whitehead and H. Newton, in May, 1874, at Miller's Dale, Derbyshire. Its nearest ally is *C. digitata*, from which it differs in its smaller size, with a shorter rhizome and branch, much closer inflorescence, female spikes shorter, more curved, and nearly sessile, its scales smaller and paler in colour, considerably shorter than the fruit. Dr. Trimen indicates several counties in which *C. digitata* is found, including Derbyshire and Yorkshire, and suggests that those botanists who have the opportunity should search these localities for *C. ornithopoda*. Its habitat in Miller's Dale is on dry, grassy banks, and on ledges of dry and exposed limestone rocks.

Reports of Societies.

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ACKWORTH SCHOOL JUVENILE IMPROVEMENT SOCIETY.—Although this title scarcely comes within the scope of a Natural History Society, yet its work, judging from its report, must be of a highly satisfactory character to every adult naturalist ; for we are sure nothing can contribute so much to the healthy growth of the youthful mind as an early training along the paths of scientific research. It is for this reason, and in the hope of stimulating the managers of other schools to "go and do likewise," that we have pleasure in noticing the report just come into our hands. The boys are in the habit of writing and reading essays on a variety of subjects which must train their minds to research ; and, besides this, they make periodical excursions into various districts in search of objects of Natural History and Archaeology, which will equally train their minds to careful observation. The Association further possesses a Herbarium, containing 633 flowering plants and ferns, 56 mosses, and 63 Madeira ferns ; a collection of local shells some 70 in number, a cabinet of birds, and a library, to which a considerable number of standard works on scientific subjects have been added during the year. Diaries are also kept by the boys of botanical, ornithological, &c., occurrences, and two prizes are awarded annually for the two best diaries in each department. This little organisation is worthy of record and copy, and, moreover, furnishes an example which many of our adult Natural History societies might follow with advantage.

We hope to hear more of their continued success, as the managers report that "they have no hesitation in saying that this little association is of real service in the school."

GOOLE SCIENTIFIC SOCIETY.—At a meeting held in Goole on May 5th, it was resolved that a society should be formed in that town, for the cultivation of science, to be called the "Goole Scientific Society." It was decided to meet once a month in the summer for excursions to places of interest, and in winter for the exhibition of specimens, and the reading and discussion of papers on scientific subjects. M. A. Morris, Esq., was elected president, and Dr. Parsons secretary. After the business of the meeting had been transacted, Dr. Parsons gave an address on the characters of mosses, illustrated by microscopic preparations and recent specimens. Votes of thanks were given to the president for the active part he had taken in the formation of the Society, and to Dr. Parsons for his lecture. The first excursion of the Society took place on June 19th. The members met at Moorfields, near Goole, and proceeded to Thorne Waste, under the guidance of Capt. Best, who there read a paper on the peat deposit, in which its extent (much greater below than upon the surface), origin, age, structure, physical properties, chemical composition, and analogy with coal, were ably pointed out. Several interesting plants, including *Vaccinium Oxycoccus*, the three British species of *Drosera*, *Andromeda polifolia*, and *Comarum palustre*, were found on the moor ; and the first excursion of the Society was

agreed to be an entire success, to which the fine weather, and the genial kindness of Capt. Best greatly contributed. The next excursion of the Society was arranged for July 17th, to Pontefract Castle, where a paper would be read by T. W. Tew, Esq. The Society at present numbers 24 members.—H. FRANKLIN PARSONS, M.D., Secretary.

GOOLE SCIENTIFIC SOCIETY.—A joint excursion of the Goole Scientific Society and the Huddersfield Literary and Scientific Society, was made on July 17th, to Pontefract Castle, where a paper, the fruit of much laborious research, was read by Mr. Tew, J.P., giving an account of the Castle, and of the events in English history of which it was the scene, from its foundation by Ilbert de Lacy in the reign of William the Conqueror, to its demolition by order of Parliament, in 1649. The ruins were carefully examined, the party descending with lights into the subterranean passages and magazine cut out in the solid rock (of a soft Permian sandstone) on which the Castle was built. The following plants were found firmly established on the ruins:—*Cheiranthus Cheiri*, *Diplopaxis tenuifolia*, *Smyrium Olusatrum* and *Echium vulgare*.

HUDDERSFIELD NATURALISTS' SOCIETY.—Ordinary Meeting, July 5th, 1875, the President, G. T. Porritt, F.L.S., in the chair.—Mr. Nettleton complained of the decrease of the mollusca in our ponds, and suggested that either the Society or a number of its members should take a field, with

a run of water through it, for the purpose of making ponds, in which to preserve shells and aquatic plants.—Mr. Hobkirk named two old red sandstone fossil fishes, *Cephalaspis* and *Osteolepis*, exhibited by Mr. Conacher, from Scotland. The plants were principally exhibited by Mr. John Armitage, taken from his garden, but originally collected wild. Amongst a large number of others, the following may be particularised:—*Geranium sylvaticum*, *molle*, *lucidum*; *Rosa arvensis*, *villosa*, *rubiginosa*, *spinosissima*; *Galium mollugo*, *uliginosum*; *Plantago coronopus*, *maritima*, *media*, *major*, *major* var. *rosea*; *Achillea tanacetifolia*, *Dianthus deltoides*, *Cerastium alpinum*, *Arenaria agrimonoides*, *Mentha minima*, *Oxalis corniculata*, *Thymus serpyllum*, ditto var. *alba*; *Prunella vulgaris*, var. *alba*; *Lycopsis arvensis*, *Borago officinalis*, *Centauraea scabiosa*, *Draba incana*, *Conium maculatum*, *Bryonia dioica*, *Salvia verbenaca*, *Herniaria glabra*, *Campanula persicifolia*, *Valeriana rubra*, *Poterium sanguisorba*, *Epilobium alpinum*, *angustifolium*, *tetragonum*; *Myriophyllum spicatum*, *Cardamine impatiens*, *Fragaria vesca* (with ripe fruit and flowers), *Veronica officinalis*, *Polypodium Dryopteris*, *Phegopteris*; *Scandix pecten-Veneris*, *Trifolium minima*. Mr. Armitage dwelt on the distance to which the seeds of *Oxalis* and other plants spread naturally, the cultivation of varieties, and many other interesting points. He had taken a white variety of *Prunella vulgaris*, and its seedlings had remained white during the twelve years he had grown it.—Mr. Liversedge

exhibited the nest and eggs of nightingale (*Philomela luscinia*), sedge warbler (*Parus caudatus*), and corn bunting (*Emberiza miliaria*). Mr. Palmer had found the nest of the long-tailed tit (*Parus caudatus*) in Dungeon Wood.—Mr. Mosley named the entomological specimens, comprising preserved larvæ of *Vanessa urticæ*, *Hyberna progemmaria*, *Phygalia pilosaria*, *Orthosa ypsilon*, *Cymatophora flavicornis*, *Cidaria fulvata*, *Cucullia verbasci*, imagos of *Hepialus velleda*; ditto var. *carnus* (very common this season); *Euplexia lucipara*, *Thera firmata*, *Nola cuculatella* (from larva taken at Sherwood), *Cloantha solidaginis*, *Larentia cæsiata*, *Melanippe montanata*, *Procris geryon*, *Campogramma bilineata*, *Hadena dentina*, *Mamestra gemina*, *Xylophasia polyodon*, *Hadena glauca*, *Eupithecia nanata*, *Phycis carbonariella*, and *Agrotis segetum*.—Mr. Porritt exhibited two specimens of *Erastria venustula*, taken by Mr. D. Price, at Horsham, Sussex.—Mr. Thomas Lister, of Barnsley, read a paper on “The Birds of Yorkshire,”* which was a continuation of a paper read before the Society at the beginning of this session. This time he took the birds from the falcon and hawk tribe to the warblers. Mr. Lister dwelt on the distinction between the falcons, which have dentate beaks and round nostrils, and the hawks proper, which have oblique nostrils. After a vote of thanks had been given to Mr. Lister for his very interesting paper, the meeting was brought to a close.

GEO. BROOK, Hon. Sec.

* An abstract of this paper will appear in our next issue.

MIRFIELD NATURALISTS' SOCIETY.—The members of this Society met on Saturday, the 3rd July last, in the Working Men's Room, Snakehill, the president, Mr. Simeon Kaye, in the chair. Two new members were admitted into the Society, and other business transacted, after which the plants, numbering 128 (112 of them being in flower), were named and commented upon. Amongst the plants we observed *Campanula trachelium* (nettle-leaved campanula), *Medicago sativa* (purple medic), *Medicago officinalis* (yellow medic), *Listera ovata* (tway-blade), *Jasione montana* (sheep'sbit), *Myrrhis odorata* (sweet cicely), and *Orchis maculata* (spotted orchis). The spotted orchis is very plentiful in this district.—The meeting was a very instructive and pleasing one. The above Society hold their meetings on the first Saturday in every month.

EDWIN STOKE, Hon. Sec.

OVENDEN NATURALISTS' SOCIETY.—The monthly meeting of this Society was held on Saturday, in the Society's meeting-room, Queen's Head Inn, Illingworth, Mr. T. Robertshaw, the president, in the chair. The following, amongst a number of other botanical specimens, were exhibited, collected by Messrs. C. Sheard, T. Robertshaw, and S. Collins:—Intermediate winter-green (very rare), great leopard's bane, round-leaved sundew, meadow crane's-bill, wood crane's-bill, jagged-leaved crane's-bill, yellow iris or water flag, common speedwell, creeping loose-strife or moneywort, black bindweed, wood betony, and evergreen alkanet. The plants

were named by Mr. R. Earnshaw. Mr. T. Hirst exhibited a number of very rare birds, viz:—eagle owl, marsh harrier, ringtailed harrier, sand grouse, Norfolk plover, pair of ptarmigans, pair of grey shrikes, pair of red-legged partridges, and also eight skins of the red-legged partridge. Mr. S. Collins exhibited a number of specimens in entomology, including clouded magpie, northern egger, and tiger beetle, which were named by Mr. S. Collins. Mr. T. Robertshaw, the president, read a letter from Lea Priestley Edwards, Esq., of Castle Carr, stating that permission had been given to the members of the West Riding Naturalists' Society to ramble and botanise on the grounds belonging to him in Luddenden Valley, on the 10th of July; and also from Captain Holroyde, of the Hollins, Warley, who had also given permission to the members to ramble over his grounds. A vote of thanks to the two gentlemen brought a very interesting meeting to a close.

CRYPTOGAMIC SOCIETY OF SCOTLAND.—At a meeting of this recently-formed Society, held in Perth, on 16th April, Dr. Buchanan White in the chair, after the officers had been formally elected, the arrangements for the first general annual meeting were completed as far as possible. This meeting will be held in Perth, in September, and many distinguished English mycologists have already intimated their intention of being present. The programme for the three days is as follows:—Wednesday, 29th Sept.: Field excursions. Thurs-

day, 30th: Arrangement and examination of specimens—business meeting—fungus dinner. Friday, 1st Oct.: Show of fungi and other cryptogamic plants, in the City Hall, Perth. Any information required may be obtained from the General Secretary, Dr. Buchanan White, Rannoch, Perthshire; or the local secretary, Mr. J. Young, C.E., Tay Street, Perth.

WEST RIDING CONSOLIDATED NATURALISTS' SOCIETY.—On Saturday, July 10th, the members of the West Riding Consolidated Naturalists' Society had one of their general exploring excursions up the valley of Luddenden, a water shed supplying one of the tributaries of the river Calder. The ramble in this direction extended to the moors and Castle Carr, the seat of Lee Priestley Edwards, Esq. The intermediate grounds in the valley searched over were the “Hollins,” the estate of Captain Holdroyde. Other investigating parties traversed the country between Halifax on the one hand, and Mytholmroyd and Cragg Valley on the other, to Luddendenfoot, where, towards five o'clock, most of the parties having united at the Anchor Inn, a substantial tea was partaken of, after which a meeting was held, representatives from the following local societies being present:—Huddersfield, Heckmondwike, Ovenden, Stainland, Liversidge, Rastrick, Mirfield, Honley, Middle-town, Paddock, Halifax, &c. G. T. Porritt, Esq., F.L.S., of Huddersfield, vice-president of the Society, occupied the chair, commencing the proceedings by calling upon

the honorary secretary to read the minutes of the last meeting, held at Rastrick on the 12th of June. This part of the business having been satisfactorily disposed of, Mr. Joseph Tindall, of Huddersfield, by desire, named the fossils exhibited by Mr. James Binns, of Warley, and Mr. J. Cockcroft, of Ovenden, amongst which were *Pecten papyraceus*, *Arenicolites*, *Goniatites Listeri*, *Posydonia mya*, three *Lepidodendra*, *Pecopteris aquilina* (very fine), *Lepidodendron selaginoides*, *Calamites approximatus*, *Trigonocarpon obovatum*—all from the district : also a specimen of galena, or lead ore, from Warley Moor, and of marcasite from Wadsworth Moor.—Mr. James Spencer, of Halifax, was next called upon to deliver a lecture on the geology of the district, which he illustrated by sectional diagrams, and describing the stratification and fossils from the Yoredale shales of Horsebridge Clough, through the various millstone grits, with their ironstone band, containing numerous fish remains, including *Acrolepis*, &c., to the upper sandstone beds in the more immediate neighbourhood. — Mr. Porritt named the lepidoptera, and made some remarks on the death of Mr. Doubleday, after which he called upon Mr. John Conacher, of Huddersfield, to name the specimens of Conchology, which were as follows :—*Sphaerium corneum*, *Pisidium nitidum*, *Planorbis vortex*, *P. carinatus*, *P. albus*, *P. nitidus*, and *P. complanatus*. Mr. Conacher stated that the district was not very prolific in that department. A very large collection of Botanical specimens lay on the table, a few of

which were of a rather rare description, but there was not time to name them. The Mosses were named by Mr. C. P. Hobkirk, who also, in answer to several queries, reported on the progress of the new magazine, &c., which, on the motion of Mr. Spencer, seconded by Mr. E. Stocks, of Mirfield, and carried by the meeting, was to be called “THE NATURALIST.” Votes of thanks to Lee Priestley Edwards, Esq., Captain Holdroyde, and Mr. J. Spencer concluded the meeting.

J. M. BARBER, Hon. Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—The usual meeting of this Society was held on Wednesday evening, July 14th, at the house of Mr. Prest, Holgate Road, Mr. W. Simmons in the chair. Mr. Wm. Chapman and Mr. H. Aitken were elected members. Mr. Jackson exhibited *O. Gonostigma*, bred from larva taken by himself in Askham Bog, and new to the district ; also *A. Leporina*, *P. Festucæ*, *H. Unca*, and a fine variety of *H. Hectus*. Mr. G. C. Dennis, *G. Papilionaria*, *S. Vetulata*, *S. Rhamnata*, *C. Sparsata*, *C. Elpenor*, and *T. Subtusa*. The chairman exhibited *T. Leucographa*, *E. Dolobraria*, *E. Orbicularia*, *M. Alternata*, and *P. Davisellus* ; Mr. Dutton, *P. Bajularia*, bred *A. Menyanthidis*, *M. Anceps*, and a fine variety of *S. Populi* ; Mr. M. Smith, bred specimens of *A. Megacephala*, *A. Rumicis*, and *B. Quercus* ; Mr. Wolstenholme, the nest of the Weaver bird, *P. Socius*, from India ; Mr. Robinson distributed larvæ of *L. Dispar* to those members who required that species. The

secretary (Mr. Prest) exhibited a fine-bred series of *C. Sagittata*, bred from larvæ taken last year in Cambridgeshire : *C. Quadrifasciaria*, *P. Roborella*, bred, *E. Isogrammata*, bred from larvæ taken at Monk's Wood, near Huntingdon ; *H. Dyso-dea*, from larvæ taken at St. Ives ; *E. Valerianata*, bred from larvæ taken near York ; and *D. Costana*, bred from larvæ taken last month during the excursion to Gormire. After some discussion, an excursion was fixed for the Tuesday following (July 23rd) to Sherburn, for Ca-wood Woods.

Notices of Books.

"THE NORTH STAFFORDSHIRE NATURALIST FIELD CLUB'S ANNUAL ADDRESSES, PAPERS, ETC," July, 1875. Price 5s. Published by William Timmis, Hanley. — This book, as its title would suggest, is a compilation of selected papers, with the annual addresses of the Presidents read at various meetings, and excursions of the North Staffordshire Field Club during the last five years. The Society is a large and flourishing one, and the book before us does it great credit. The papers are evidently carefully selected and admirably compiled. At the end of the book is a capital list of the Macro-lepidoptera observed in North Staffordshire by members of the Club, compiled by its energetic secretary, the Rev. Thos. W. Daltry, M.A., F.L.S., which shows North Staffordshire to be a rich district in this branch of Entomology. We can cordially recommend the book to our readers.

"MERRIN'S LEPIDOPTERISTS' CALENDAR. 2nd Edition, July, 1875. Gloucester : Herbert Marsden, Regent-st. Price 3s. 6d.— We have not had time to make more than a very superficial examination of this book, but have seen sufficient to convince us that it is a great improvement on the 1st Edition. Under each month of the year are given the species (both Macro and Micro-lepidoptera) as they appear as ova, larvæ, pupæ, and imagos, with the plants, &c., upon which they may be found, so far as is known up to the present time. The Work will be a useful one, especially to those who are just beginning the study of the Lepidoptera ; and although, in a tabulated Work of this kind, it would be almost impossible to avoid an occasional inaccuracy, we can well afford to look over them, where so much of good is to be found.

Extracts from Correspondence.

Mr. W. Denison Roebuck, Hon. Sec. of the Leeds Naturalists' Society, offers the following :—"I would suggest that you should have a diary, on the cover, of the meetings and excursions of Yorkshire Societies, similar to the one now given in "NATURE."—[We shall only be too glad to carry out this suggestion, and shall be obliged if the secretaries of such Societies will furnish us with the requisite information for it, as early as possible.—*Eds. Nat.*]

N.B.—The Editors will be obliged if those gentlemen who have not already sent their Subscriptions, will be kind enough to do so on receipt of this, the first number; and any gentlemen desirous of subscribing should send their names without delay.

COMMUNICATIONS have been received from Thomas Armstrong, F.R.M.S., James Varley, Thomas Lister, Rev. J. Fergusson, R. Earnshaw, G. B. Corbin, A. S. Bradby, Heckmondwike Naturalists' Society, Geo. Jarman, &c.

EXCHANGE.

DESIDERATA.—The following Lepidopterous larvæ are much wanted for *figuring*:—*Sinapis*, *Edusa*, *C. Album*, *Megæra*, *Alexis*, *Arion*, *Bombyliformis*, *Furcula*, *Bifida*, *Fagi*, *Cucullina*, *Dictæoides*, *Dromedarius*, *Chaonia*, *Dodonæa*, *Aceris*, *Auricoma*, *Hepatica*, *Scolopacina*, *Anceps*, *Albicolon*, *Furva*, and many others. Duplicates, various larvæ.—OWEN WILSON, Cwniffrwd, Carmarthen.

TO CORRESPONDENTS.

The Editors will esteem it a favor, if the Secretaries of Field Clubs and Naturalists' Societies throughout the Kingdom will favor them with occasional Notes of their proceedings and Excursions, when of interest.

Papers read at Meetings of these Societies, or otherwise, on any branch of Natural History, will be gladly received and inserted in full, if of sufficient general interest, or in abstract, if of only local interest.

All communications, except Advertisements, Exchanges, or Short Queries, should, if possible, be in the hands of the Editors not later than the 18th of the current month, to insure insertion in our next issue, and should be written on one side of the sheet only.

N.B.—The Editors cannot undertake to return rejected papers, unless accompanied by a stamped addressed cover.

Natural History advertisements inserted on liberal terms.

All communications must be addressed to the Editors, care of Mr. B. BROWN, Publisher, Huddersfield.

IS THERE SUCH A THING AS A SPECIES?

BY CHAS. P. HOBKIRK.

[Continued from p. 9.]

And this position is further strengthened by a paper published by Crèpin in the Bulletins of the Royal Bot. Soc. of Belgium, in April, 1864, in which he compares the position of four different authors of the Floras of France, showing what forms some admit as species which others consider as mere varieties, and *vice versa*; but the space at my disposal will not permit me to do more than merely to mention this, and not to give the particulars, which are really interesting. Near the conclusion of the paper he writes:—"We must be convinced that the authors who have furnished us with these examples have admitted as species forms of a much lower value than others, which they have relegated to the rank of simple varieties." Now comes the question again—what is a species? How can we answer it? The four or five great authorities which we have quoted differ in their estimates, and not only so, but many plants which some call species are by others called merely varieties. Is there, then, really in nature such a thing as a species, or such a thing as a variety? Are the two separable, or are they not? Let us look at it in the light of Darwinism and see if that will give us any clue. Most writers agree in this, that a species may be the descendants of common parents; and that if any particular form can be traced distinctly to its parent stock, even if it differ in some particulars from that stock, it is really a part of a species, and must rank as a mere variety, and not as another species.

All this is specious enough on paper, but then how are we to trace their descent? By their affinities? What are these? They are, for the most part, mere blind leaders of the blind. Granted that any form we may find, say having a dozen marked characters, nine of which connect it with a certain acknowledged specific form, there are three remaining which are not found in the type, or are different from it, and connect it with a so-called allied species. Some will refer this to one form, and some to the other. The lumpers will probably unite all three in one, and strike out the diverging characters; the splitters will retain all the characters and make three species; whereas amongst the Linneans there will be a difference of opinion—one set will call our new form a variety of one species, whilst the others will make it a variety of the other species. Which is right? Then comes again the question—What is its descent? Here we are again fast.

Darwinism would say of its descent, that it is no true guide, and probably Darwinism is right in so doing; for if descent is to be the criterion, then we have only perhaps two or three real species and numberless varieties, for all are descendants of a few primeval forms. This is a *reductio ad absurdum*.

Now, my idea of a species is this. There are a number of individuals which, although all more or less differing, yet all agree in possessing a certain number of characters, which, although themselves constantly varying in individuals, yet for the purposes of classification, and of indicating to others by a word or two what we mean, we place all together under one name, and these individuals we agree to call a species, although we are not at all clear about their descent.

Thus, can we be in any way certain of the close descent from any recent forms, of the *Rosa alpina* without prickles, of the Alps, in France, in Germany, and in Scotland? Now, there are eight so-called species of *Rosa* without prickles, or nearly so, ranked under the general sub-generic term of *Alpinæ*; one of these *alpina* occurs only on the Swiss Alps; another, *pendulina*, has been found in Scotland, and so on. May it not be, on the Darwinian hypothesis—nay, is it not absolutely true,—that these were what we may call one species, say at the time of the glacial epoch, growing all nearly alike from the Alps to the Scottish mountains, over an almost ice-bound area, with but few spots where vegetation could survive; that on the retreat of the glaciers, owing to the rising of the land and other causes, belts of sea and chains of hills cut them off from one another. Those that remained on the Scottish hills, by the change of circumstances, or environment, as Mr. Herb. Spencer calls it, became developed into the form we now call *pendulina*; those on the Swiss Alps, owing to a different change in the environment, developed into the form we now call *alpina*; those on the French and Spanish borders into the form we now call *pyrenaica*, and so on with the rest. Are these forms now so different in certain characters, then, all distinct species, or are they eight varieties of one species? As I have before stated that my own idea is that a species is merely an arbitrary term used to express what we know, or perhaps what we do not know, would not the proper answer be this: They were once one species, but now they are eight.

Were we to carry the analogy still further—though not by any means to its final stage,—at an immensely remote period may we not, reasoning from a Darwinian point of view, deduce that the nine subdivisions of the genus *Rosa* (including in Europe now some 168 species) were then only nine species, which have since developed by change of

environment, into the 168 we now find ? And, further back still, in the far remote ages of geology,—yet perhaps not going, even here, to the verge of the Cainozoic age,—we may deduce that these nine forms or species were but one ; that the genus *Rosa* was one species, of which the now term of *Rosaceæ*, including all the plants of that sub-order, was what we might call the generic name. And thus, if our means were sufficient, we might go backwards and backwards, constantly reducing our specific terms, until we come at last, and perhaps not even yet at last, to the single term “*vegetable*.” Strange as this may seem—nay, even if you will, preposterous,—yet the analogy throughout is perfectly logical, and thus demonstrates the beauty, and possibly the truth, of Darwin’s brilliant hypothesis. What may be thus done with *Rosa*, may be done more or less perfectly with every other genus of plant or animal, reducing type after type as we go backwards, till in the earliest stages of life on the earth we come to two or three original types—possibly only one. Under this light, then, what is a species ? Is there such a thing as a species, as different from a variety ? We may answer to this, both yes, and no.

Yes—because we may accept the forms which we now see around us as permanent for the present ; that, with few exceptions, they have remained so ever since they attained their present *facies*, and since the environment in which they now are came into existence, and until that environment shall again be changed, during the great secular changes of which the world is the theatre. And also so long, and so long only, as we agree to understand by the term species merely a convenient method of grouping together certain individuals which, whilst they agree in many well-marked particulars, yet have each individual characters which may become more marked in future ages.

No—because these very slight characters of to-day may to-morrow become leading features in their organisation, and they are thus incipient species, which I consider all real varieties to be. And again, because in past ages many of the forms we now call species were not in existence except as varieties ; that the genus of to-day was the species of yesterday ; and that the species of to-day will become the genus of to-morrow.

Therefore, only as an exponent of our present knowledge, and to arrange our ideas, can we admit the terms species and varieties at all. They do not admit of strict definition with hard and fast lines, but merely by assemblages of leading characters which they all possess in a greater or less degree, which are not by any means fixed or unvarying, but are constantly requiring further definition, and will continue to do so as long as the present laws govern the universe.

TEA AND ITS ADULTERATIONS.

BY GEO. JARMAIN, F.C.S., PUBLIC ANALYST, HUDDERSFIELD.

[*Read before the Huddersfield Naturalists' Society, June 7, 1875.*]

TEA began to be used in China in the seventh century, and in the ninth in Japan. It was brought to Europe in the seventeenth. In 1664 the English East India Company considered it as a rare gift to present the then Queen of England with two pounds of Tea. It is also grown in Penang, Rio Janeiro, and, within the last few years, in Assam.

The Tea plant belongs to the natural order, *Ternströmiaceæ*, which includes the *Camellias*. *Thea Sinensis* is probably the original plant, of which *T. Bohea* and *T. viridis* are the chief varieties. It is a hardy evergreen leafy shrub, from three to six feet in height, sometimes thirty feet. It is raised from seed, and is cropped from ten to twelve years.

Gatherings of the leaves are made from early Spring to August: the earliest gatherings being esteemed the best. The leaves are alternate; the flowers, which are white and somewhat like small wild roses, spring from the axils of the leaves.

The leaves present the following characters:—they bear some resemblance to the willow, being, of course, of different sizes. The border is serrated more regularly than the willow, but the serration stops short of the stalk. The venation is said to be very characteristic, on which point I shall be glad to have the opinion of the members present. The veins run almost parallel to one another from the midrib, but before the border of the leaf is reached, they alter their course, turning so as to leave a bare space just within the border of the leaf. There are also some peculiarities about the stomata of the leaves, when seen under the microscope, which aid in the identification of the true Tea leaf. The apex of the leaf has also often a characteristic notch on it, which lends additional aid.

The two varieties of black and green Tea are made from the same leaves, the treatment which each undergoes causing the difference. Black Tea is fermented during the process of manufacture. Green Tea is prepared without this treatment.

The principal varieties of black Tea are Congou, Souchong, Pekoe, and Caper; of green Tea, Twankay, Hyson skin, young Hyson, Hyson, Imperial, and Gunpowder.

The analysis of Tea gives the following result :—

Extractive matter	/	...	...	...	...	31 to 45 %
Insoluble matter	...	...	...	...	...	43 to 49 %
Moisture	...	...	...	...	...	8 to 10 %
Tannin	...	...	...	...	...	8½ to 11½ % in black.
"	...	...	...	...	...	10 to 20 % in green.
Theine	...	...	...	...	...	1 to 6 %
Ash	...	...	...	...	...	5·3 to 6·34—average, 5·75
Gum	...	...	...	...	...	variable.

The modes adopted by analysts for obtaining the above percentages were here described, and experimental illustrations given of some of the processes.

There are four kinds of sophistication which are practised :—
 (a) the mixing of leaves which are not Tea; (b) the mixture of exhausted Tea leaves which have been re-dried; (c) the addition of sand and other mineral matter; (d) colouring or facing.

(a) The adulteration of Tea with foreign leaves is but little, if at all, practised at the present day in this country; but formerly the leaves of the willow, hawthorn, sloe, beech, elder, elm, and others were used. These can readily be distinguished from true Tea by the botanical characters already alluded to. A substance known under the name of lie Tea has also been extensively used. This lie Tea is no Tea at all, but is a made-up article, and is manufactured for the purpose of adulteration.

(b) The mixture of exhausted Tea leaves, which have been re-dried, is one of the principal forms of adulteration practised at the present time. As the Tea so treated would be weak and poor, an attempt is made to restore artificially what it has lost by infusion. This is done by the admixture of tannin, in the form of catechu and gum, to give the required gloss. The Canton caper Teas are frequently made up in this way. A variation in the percentage of tannin and gum often gives a clue to this form of adulteration; also, a certain roughness and astringency in the taste of the Tea. I am at present working a process which promises to give us useful indications of this form of adulteration: it consists in using Tea as a preparation for dyeing cotton with a salt of iron. The colour obtained is so very different from that given by catechu under similar conditions, that I feel persuaded that it will not only enable us to detect, but to estimate the quantity of catechu used. The accomplishment of this is a great desideratum at the present time. Samples of cotton which had been

prepared with tea alone, with catechu alone, and also with a mixture of the two, were then exhibited.

(c) A third form of adulteration is the admixture of sand and other mineral matters, such as magnetic oxide of iron. The addition of these substances is easily discovered. A weighed quantity of Tea is burnt in a platinum capsule, and the ash is weighed. The ash of pure Tea amounts to 5·75 %, but, making every allowance for accidental admixture of dust, &c., during the preparation of it, the Society of Public Analysts has adopted 8 % as the limit of ash for genuine Tea. Any excess above this must be considered as wilful admixture. The ash of re-dried exhausted leaves is less in amount than that of genuine Tea ; we have here, therefore, another indication of this form of sophistication. Exhausted and re-dried leaves give only 3 % of ash. The ash of genuine Tea is more than half of it soluble in water, and almost the whole of it is soluble in weak hydrochloric acid : what remains undissolved is sandy matter, &c.

The presence of magnetic oxide of iron may readily be ascertained by using a magnet, which attracts that mineral.

(d) The facing or colouring of Tea. The dusting of Tea with Prussian blue, indigo, sulphate of lime, China clay, and such matters, was supposed to be necessary to please the English consumer. The bright coloured green Teas have all been treated in this way. The Bill now before Parliament will, I think, entirely do away with this form of adulteration, as it expressly prohibits the powdering, colouring, or staining any article of food or drug, with the intention of making it appear what it is not. Under the same Act also, Tea will be examined on its arrival in this country by the Custom House officials, and will not be allowed to pass into commerce, if found adulterated. The Tea sold in the country will, however, still be liable to be examined by the Public Analysts. Verily, good times are coming for those who love the "cup that cheers but not inebrates."

Huddersfield, June, 1875.

THE PLEASURES OF A MICROSCOPIST.

By THOMAS ARMSTRONG, F.R.M.S.

THE microscopist, unlike students in many branches of science, can find employment at all times and in all seasons, hence the pleasures of microscopy are summer and winter ones, and are alike enjoyed at home and abroad. The microscopist need never be idle, for, first, in

collecting his objects, afterwards in preparing and mounting them, and finally arranging and classifying them in his cabinet, he has work that should be both a pleasure and a gain. Anthropologists say the proper study of mankind is man ; agreeing with them that man is a noble object of study, we suggest there are other problems we should not neglect. With Tennyson we may say :—

“ All nature widens upwards evermore ;
The simpler essence lower lies.”

The lower kinds of animal life, also the vegetable and mineral kingdoms, are alike interesting to the microscopist. He lovingly studies nature as she breathes, palpitates, and works under myriad forms of life,—forms unseen, unsuspected, or unheeded by the non-observant man. His course may be through park and meadow, garden or lane, for everywhere we are surrounded with life, and wherever there is life, there the microscopist has material for his studies.

The life that stirs within us, stirs alike within the most minute and despised of animals, so that they are not aliens, but in that respect akin to us. The works of nature are the source of true knowledge, and the study of them the most noble employment of the mind of man. Every part of creation alike demands his attention. That man is certainly the happiest who is able to find out the greatest number of reasonable amusements easily attainable, and within his power. This being so, he that is a student of the works of nature—as a microscopist must be—is undoubtedly one of the happy ones, since every flower, insect, fruit, leaf, indeed every particle of matter, affords him an entertainment. Such a man can never let time hang heavy upon his hands ; each field or pond is a cabinet of curiosities, every one of which he longs to examine fully, and the whole universe is a magazine of wonders, which infinite ages are scarce sufficient to contemplate and admire enough.

Dr. Murie very happily remarks : “ Microscopical study is not limited to beauty of form in diminutive objects, or perfection in optical instruments ; microscopy is rather the nucleus which, as it shoots outwards, entwines among all the sciences dealing with organized forms.” The microscopical student can scarcely realise, at first, how vast is the system in which his particular object of research is but an element of detail. As with the attainment of result, so with the enjoyment by the way—he who woos her only knows the pleasures microscopy has in store for him.

Manchester, July 10th, 1875.

LIST OF RARE BIRDS

OCCURRING WITHIN A RADIUS OF TEN MILES OF HUDDERSFIELD DURING
THE LAST THREE YEARS.

BY JAMES VARLEY, ALMONDBURY BANK.

Merlin (*Falco æsalon*).—Shot by Mr. Bradbury, Slaithwaite, February 20th, 1875.

Honey Buzzard (*Pernis apivorus*).—Shot by Mr. Pemberton, Storths Hall, May 28th, 1874. Its crop contained one young bird, and egg shells of the missel thrush ; it measured 22 inches from bill to tail, and 4 feet 5 inches expanse of wing.

Short-eared Owl (*Otus brachyotus*).—One shot at Almondbury, and two at Dalton, by Mr. Lockwood, July 29th, 1873.

Pied Flycatcher (*Muscicapa atricapilla*).—Saw two in Penny Spring Wood, male and female, May 3rd, 1873.

Grasshopper Warbler (*Salicaria locustella*).—Shot by myself in Penny Spring Wood, May 14th, 1873.

Nightingale (*Philomela luscinia*).—Commenced to sing in Mollycar Wood, May 5th, 1875, and continued to June 7th. It began to sing about ten o'clock each evening, and continued till about four in the morning.

Fire-crested Regulus (*Regulus ignicapillus*).—I had the pleasure of receiving a very fine specimen of this bird, found in an exhausted state at Armitage Bridge, September 3rd, 1874.

Hawfinch (*Fringilla coccothraustes*).—I saw two very fine specimens at Longley Hall, August 23rd, 1874.

Hooded Crow (*Corvus cornix*).—Three in the neighbourhood of Storths Hall Moor for three weeks in March, 1875.

Great Spotted Woodpecker (*Picus major*).—In Penny Spring Wood, through winter of 1874-5.

Kingfisher (*Alcedo ispida*).—Ponds at Almondbury Bank, in the autumn of 1874.

Quail (*Coturnix vulgaris*).—A pair in the corn-fields about Almondbury all the summer and autumn of 1874.

Dotterell (*Charadrius morinellus*).—Five procured on the moor near Tinker's Monument, Shepley, April 20th, 1874.

Heron (*Ardea cinerea*).—Saw one at Storths Hall, June 2nd, and one passed over Almondbury Bank July 14th, 1874.

Great Snipe (*Scolopax major*).—Shot at Dalton, December 26th, 1873.

Gray Phalarope (*Phalaropus lobatus*).—One shot on the reservoir near Denby, November 20th, 1873, and presented to me by the Rev. Job Johnson, of that place.

Baillon's Crake (*Crex Baillonii*).—One shot on Horne's Dam, Kirkheaton, May 29th, 1874, by Mr. George Challand.

Water Rail (*Rallus aquaticus*).—Three shot in Dalton, January 1873 and 1874.

Leache's Petrel (*Thalassidroma Leachii*).—One shot near Halifax, November 13th, 1874, and sent to me by Christopher Ward, Esq., F.L.S., of Halifax.

THE LUDDENDEN VALLEY.

BY RODGER EARNSHAW, OVENDEN, NEAR HALIFAX.

THE Luddenden Valley, although less frequented in its middle part than most of the dales in the parish of Halifax, is by no means devoid of that natural beauty which renders many of the others such pleasant resort for hundreds of people during the various holidays of the year. Most of those who have been into the valley, either on business or on pleasure, have entered it at the foot and proceeded no further than Luddenden or Booth; or at the head, and have confined themselves to the neighbourhood of Castle Carr, and the Halifax Corporation reservoirs immediately above that place: leaving the middle of the valley unexplored. No doubt the principal reason for this is the fact that the roads between Luddenden and Castle Carr are none of the best, even for pedestrians, whilst to those who travel in vehicles, they present many difficulties, not the least of which is that a portion, being only a bridle-stye, can only be travelled in vehicles by favour. The valley, however, has natural beauties and attractions, which make it worth the while to lovers of these to risk all the difficulties consequent on its exploration; and, perhaps, a short description of it will not prove unacceptable to both the residents in the valley itself, and to the inhabitants of the parish at large. I shall, however, confine my remarks to the middle and upper portion of the valley, from Booth to Fly-flats. On leaving Booth we should take the road on the Midgley side of the valley, by Catherine House and Harrowbutlee: on this road we soon see Holme House, a large residence situated in the bottom of the valley, which above this point becomes very lovely, being much wooded. On the

Warley side is Wade Wood, a place which has long been noted for its richness in botany. On reaching Catherine House we have a fine view of Castle Carr and its surroundings; the Castle itself is on an elevated site, considerably above the stream, between two very high hills. To the left is Castle Scout, wooded to the top; and to the right, Saltonstall Moor, whilst behind, standing out clear against the sky, is the straight line of Midgley Moor. In the foreground is a grand plantation, through which runs and tumbles a clear stream, and the whole forms a picture for the study of the artist or the lover of natural beauty, such as is rarely to be met with. Above are the Lower Dean and Upper Dean storage reservoirs, whilst far above again, on Warley Moor, is the large sheet of water known as "Fly-flats." A visit to these will well repay the pedestrian for his labour, as, in addition to the marvels of engineering skill displayed in the construction of the works, the natural scenery on the route is of the grandest character.

Leaving Castle Carr, we follow the stream down the valley, which is well wooded on both sides with large trees, whilst the beautiful and clear stream contains an abundance of trout.

Amongst a large number of plants found in this valley, may be mentioned the following:—*Listera ovata*, *Habenaria viridis*, *Scutellaria galericulata*, *Cotyledon Umbilicus*, *Hypericum humifusum*, *H. quadrangularum*, *Paris quadrifolia*, *Oenanthe crocata*, *Geranium sanguineum*, *G. columbinum*, *Iris pseud-acorus*, &c.

Short Notes and Queries.

Dr. F. BUCHANAN WHITE, F.L.S., writes me from Rannoch, under date July 24th, that he has taken a few days ago, a fine new British *Tortrix*—*Ablabia argentana*. This is a good addition to our list.—GEO. T. PORRITT.

E. STOKS, Hopton, would like to know where he could obtain specimens of the round-leaved sun dew (*Drosera rotundifolia*), and the ivy-leaved bell flower (*Campanula hederacea*).—[The former grows in

several places on the moors in this district—at Slaithwaite Moor, near Boshaw Reservoir, &c., &c. *Wahlenbergia hederacea* was found on the moors near Dunford Bridge, in 1861, but is not so common as the *Drosera*.—Eds. Nat.]

THIS summer has been, up to now, by no means good for any branch of Natural History. The flowers even do not seem to come out nicely, they seem overdone with rain. The insects cannot get on at all; butterflies and moths, too, look more as if they had bybernated than been hatched from the chry-

salis, the bloom seems washed from their wings. The young birds of different species of migrants are beginning to come off their nests now; young stone curlews (*Adicnemus crepitans*) are as large as thrushes, and can run nearly as fast as the old birds; young chimney swallows (*Hirundo rustica*) I first saw flying about on July 14th, young pied wagtails (*Motacilla alba*) were about our ponds on the 15th, and on the 16th young spotted flycatchers (*Muscicapa griseola*) were perching on the rails and posts at the lower part of this village.—

ANTHONY S. BRADBY.

*Preston Candover,
Basingstoke, Hants.*

[Our own experience, in this and other parts of the country, is, that we have not had so good a season for lepidoptera for several years.—*Eds. Nat.*]

L. QUADRA AT YORK.—I had the good fortune to take a specimen of this fine species in Askham bog, on Friday evening, July 23rd. It was flying gently at dusk, and was in splendid condition. This is the first specimen taken at York, and is a good addition to our local fauna.—W.M. PREST, Holgate Road, York.—[It will be noticed, from the Huddersfield Naturalists' Society's Report, that Mr. Brook has also taken this species, at Redcar, quite recently. It thus seems to be gradually coming northward.—*Eds. Nat.*]

S. CONVOLVUTI.—Yesterday I had a specimen of this fine species brought to me. It was found at

rest on the Cemetery Road, and to-day another was taken to Mr. Jackson, found at rest in Buckingham Street, near the centre of the city. From the early appearance of this species, we may have a *Convolvuli* year, and entomologists had better be on the look-out.—

W.M. PREST.

August 10th, 1875.

E. ALBIPUNCTATA.—I have been of opinion some years that this species was double-brooded, from the fact that in York we have always had the imagoes before the end of April. In the middle of last June, when at Cawood Wood, I took four larvæ on *Anthriscus sylvestris*, which I at once saw were *albipunctata*, and from them I have, during the last week, bred three imagoes; there is not much difference from the spring brood, except that they are very much smaller, and not quite so dark in colour.—W.M. PREST.

August 9th, 1875.

Reports of Societies.

HECKMONDWIKE NATURALISTS' SOCIETY.—A meeting of the Society was held on Saturday evening, June 26th, T. B. Oldfield, Esq., in the chair. Mr. Joseph Tindall, of Huddersfield, read a paper on the “Nebular Theory of the Origin of the Earth,” after which a short discussion followed. There were upwards of thirty specimens of botany on the table; a number of entomological and ornithological specimens were also exhibited by

the members, and the president afterwards gave an instructive and interesting lecture on "Our British Reptiles," dwelling particularly on their harmlessness, and places and modes of breeding, &c.—THOS. J. BROOKE, Hon. Sec.

HECKMONDWIKE NATURALISTS' SOCIETY.—The usual monthly meeting of the Heckmondwike Naturalists' Society was held on Saturday evening, 24th July, at the house of Mr. J. Robinson, High Street, the Vice-president, Mr. J. M. Barber, in the chair. The meeting was one of a social and conversational character, and several interesting subjects were introduced and discussed. Communications and reports from kindred societies were read, and arrangements made to attend the West Riding Consolidated Naturalists' Society's ramble and meeting at Knottingley. A number of beautiful American bird skins, sent for exchange for British specimens, were exhibited. In addition to these, some geological specimens sent for inspection by Mr. Clarke, and some fossils from Derbyshire, sent by Mr. J. W. Clegg, were exhibited.

HUDDERSFIELD NATURALISTS' SOCIETY.—Ordinary Meeting, July 17th, 1875.—Jno. Joseph French was elected to the chair, the president and vice-presidents being absent. Mr. Allen Godward named a very extensive collection of plants, chiefly exhibited by Mr. Conacher. Mr. G. T. Porritt having arrived, named the lepidop-

tera, which included *Rusina tenebrosa*, *Tryphæna fimbria*, *Melanippe hastata*, and others, exhibited by Messrs. Mosley and G. Liversedge. Mr. Porritt also exhibited a series of preserved larvæ of *Selenia lunaria*, *Eupithecia sobrinata*, and *assimillata*, mounted on artificial leaves and sent to him by Lord Walsingham, which elicited great admiration.—Mr. Ed. Porritt read a paper on "The study of Natural History," in which he urged the claims of natural science on our spare moments and idle hours, not only for the amusement and healthy exercise which they afford, but also as a means of diffusing that elementary knowledge which is so essential to the well-being of our nation.—After Mr. G. T. Porritt had announced the death of Mr. Henry Doubleday, of Epping, which was very much lamented, the meeting was brought to a close.

HUDDERSFIELD NATURALISTS' SOCIETY.—Ordinary Meeting, August 2nd, the President, Mr. G. T. Porritt, F.L.S., in the chair.—Mr. Joseph Tindall exhibited some fossilised nuts, taken from a reservoir at present being constructed at Upperthong, where in some places the overlying clay was 12ft. in thickness.—The President exhibited a series of lepidopterous insects taken by himself, in Kent, about a fortnight previously. They included the rare *Nola albularis*, *Pterophorus rhododactylus*, *Apatura Iris*, with *Cymataphora duplaris*, *Thyatira batis* and *derasa*, *Epunda viminalis*, *Caradrina morpheus*, *Xylophasia hepatica*, *Calligenia*

miniata, *Pempelia roborella*, *Eublea crocealis*, *Pterophorus lithodactylus*, and many others.—Mr. Geo. Brook exhibited a number of species he had recently taken at Redcar, amongst them *Plusia interrogationis*, *Tryphaena interjecta*, *Lithosia quadra* and *Tryphæna subsequia*—all taken on the sand-hills; it was considered singular that *subsequa* and *quadra* should occur in such a situation. Mr. S. L. Mosley showed a series of larvæ, pupæ and imagos of *Abraxas grossulariata* and *Vanessa urticæ*, mounted very effectively in their natural positions on twigs.—Mr. J. E. Palmer made some observations on a martin's nest he had noticed near Malham Tarn. It was built some distance down the wall instead of in the usual position under the eaves, was constructed much as usual, but domed over, with an entrance at the side. A large number of plants from the Askern district were laid on the table, chiefly by Mr. Joseph Tindall, and were named by Mr. Ed. Taylor, amongst them being:—*Achillea tanacetifolia*, *Calamintha Acinos*, *Ranunculus arvensis*, *Pimpinella Saxifraga*, *Dipsacus sylvestris*, *Anthyllis vulneraria*, *Œnanthe fistulosa*, *Geranium pratense*, *Linaria spuria*, *Lastrea Thelypteris*, *Lythrum Salicaria*, *Centaurea Scabiosa*, *Campanula glomerata*, *C. Trachelium*, *Draba incana*, *Rumex Hydro-lapathum*, *Nuphar lutea*, *Verbascum Thapsus*, *Erigeron acris*, *Lepidium campestre*, *Peucedanum Ostruthium*, *Juniperus communis*, *Veronica scutata*, *Anagallis tenella*, *Bartsia Odontites*, *Narthecium ossifragum*,

Scabiosa columbaria, &c.—Mr. Wm. Clegg read a very interesting paper on “The Phosphorescence of the Sea.” After describing the general appearance of phosphorescence, Mr. Clegg described several of the animalculæ which contribute to its formation. Of these, *Noctiluca* is the most important, as being the most plentiful on our coasts. It is a minute, jelly-like animal, possessing a long tail, probably used for locomotion. Besides *Noctiluca*, many other organisms contribute their light, *Medusæ*, *Tunicata*, *Annelides*, and even fishes being amongst the number. Shoals of herring leave a white line in their track. The herring-fishers do not shoot their nets unless they can find a track. The cause of phosphorescence is not decided, but, at any rate, no heat is produced. If highly luminous water be filtered so as to collect a large quantity of animalculæ on the filter, and a delicate thermometer be plunged into the luminous mass, no elevation of temperature is noticed. The mode of production of phosphorescence is not always the same. In *Noctiluca*, and similar organisms, a vital process seems to go on over the whole body, while in many annelids, and other animals of higher organisation, a special apparatus is required.—After a short discussion, the meeting was brought to a close.—GEO. BROOK, Hon. Sec.

MIRFIELD NATURALISTS' SOCIETY.—The members of this Society met on Saturday evening, the 14th August, in the Working Men's Club Room, Snake-hill. After the gen-

eral business of the Society had been transacted, the plants were named and commented upon. Owing to the very wet weather, only 40 specimens were procured, 35 of them being in bloom. One of the members, however, had been at Sherburn, and had gathered several plants peculiar to that neighbourhood. He reported that in the church-yard there, the deadly nightshade, *Atropa Belladonna*, was growing quite abundantly, and he produced that plant, along with others, at the meeting.—E. STOKS, Secretary.

OVENDEN NATURALISTS' SOCIETY.—The monthly meeting of this Society was held on Saturday, July 31st, in the Society's meeting-room, Mr. T. Robertshaw, the President, in the chair. Mr. J. Tindall, of Huddersfield, read a very interesting paper on "The Limestone Formation and its belongings," which was listened to with very great interest. A number of botanical specimens, collected by Messrs. C. Sheard, J. Downs, and J. Ogden, were laid on the table, and named by Mr. D. Wilson and Mr. R. Earnshaw, which were as follows:—*Sagittaria sagittifolia*, *Sanguisorba officinalis*, *Stachys Betonica*, and *palustris*, *Bidens tripartita*, *Poterium Sanguisorba*, *Circeea lutetiana*, *C. alpina*, *Geranium phaeum*, &c., &c.—Mr. T. Hirst exhibited a number of very rare birds, including a pair of greenshanks, pair of spotted wood-peckers, pair red-headed wood-peckers, pair green-throated humming birds, red-throated Oriole

blue creeper, Cupreous cuckoo, and one peregrine falcon.—Mr. T. Cockcroft exhibited an albino sparrow, with pink eyes, taken in Mr. Horner's brewery, Shaw Lane, July 3, having been bred there.—Mr. R. Earnshaw exhibited a number of birds' eggs, including heron, oyster-catcher, guillemot, jay, turtle dove, nut-hatch, wry-neck, lesser redpole, great titmouse, common sandpiper, stonechat, greater whitethroat, swallow, bullfinch, and heron gull.—Mr. S. Collins exhibited larvæ of *Eriogaster lanestris* and a dragonfly. A number of geological specimens were exhibited (which had been found during the day) by Messrs. J. Binns, J. Spencer, T. Cockcroft, and T. Robertshaw. During the month the members have had one of their rambles for the season, the place selected being that portion of Airedale between Keighley and Steeton. The members were taken in conveyances from Ovenden to Keighley, and on arriving there they were invited to the house of Mr. J. Calvert, to look at his collection of birds and lepidoptera. The party were also invited to the house of Mr. J. Milner, to inspect his collection of moths and beetles, which was also a very good and interesting collection. On leaving Keighley, they went by Skipton Road to Hawcliffe, a beautiful place on the west side of Skipton Road. From the top of the cliff they had a fine view of the surrounding country, whence they went to Steeton, and afterwards by the river-side to Keighley, arriving about six o'clock

—having spent a day in one of the most beautiful dales in the West Riding.

TODMORDEN BOTANICAL SOCIETY.

—The monthly meeting of the above Society was held on Monday evening, August 2nd, at the White Hart Hotel, the President, Mr. Stansfield, in the chair. The Assistant-Secretary laid before the meeting a prospectus of a new publication entitled the "Yorkshire Naturalist and Journal of the West Riding Consolidated Naturalists' Society," and the Secretary was requested to order it for the Society. Mr. Green again favoured the Society with the plant he brought to the last meeting, respecting which there had been some doubts. The President said the Linnæan genus *Cactus*, to which the plant belonged, consisted of several hundreds of species; De Candolle and others had broken it up into five genera, viz. :—*Opuntia*, *Echinocactus*, *Mammillaria*, *Cereus*, and *Epiphyllum*. The one on the table belonged to the genus *Opuntia*. The plants of this genus furnished food for the cochineal insect which yielded the cochineal of commerce; the fruit was also eaten under the name of Indian fig. He pointed out the characteristics of the other genera, the general structure of the plants, and the analogy of the order, which he said was near the *Grossulariaceæ*, or gooseberry tribe. He thought the plant on the table was the *Opuntia Tuna* of De Candolle (*Cactus Tuna* of Linnaeus), but from the small portion exhibited he could not be certain. Mr. Law showed a collection of fossil

bones from Derbyshire, which were very interesting, and appeared to be in every way analogous to the osseous deposits of caverns in various parts of England.

WEST RIDING CONSOLIDATED NATURALISTS' SOCIETY'S MEETING AND RAMBLE AT KNOTTINGLEY.—

The fifth ramble and general meeting of the season in connection with the West Riding Consolidated Naturalists' Society, took place on Saturday, Aug. 7th. The country investigated during the day comprised the neighbourhood of Pontefract, Askern, Campsall, Smeaton, Smeaton Craggs, Wentbridge, Darrington, Norton, Womersley, and Knottingley. The early part of the day proved favourable, but from about one o'clock to five a heavy and continuous thunderstorm swept over the district, the rain for hours pouring down almost incessantly. A break in the storm, from four to seven o'clock, allowed the members, who had arrived at Knottingley during the afternoon, the opportunity of rambling over the more immediate neighbourhood and making such local collections as time permitted. The meeting was held in a large room adjoining the Swan Inn, which had been prepared for the occasion. The collections of the day having been arranged on the table, the president (J. Wainwright, F.L.S., of Wakefield), took the chair, and G. T. Porritt, F.L.S., of Huddersfield, the vice-president, the vice-chair. The following Societies were represented:—Huddersfield, Heckmondwike, Ovenden, Wakefield,

Liversedge, Birkby, Mirfield, and Middlestown. The report of the last meeting, held at Luddenden Foot, on July 10th, as printed in the "Naturalist," was unanimously adopted, after which the president briefly addressed the meeting, limiting his remarks to congratulating the members on the establishment of a new Natural History Journal in connection with the Society, and strongly urging the desirability of each member becoming a subscriber, and as far as possible a contributor to its pages. He concluded his remarks by reverting to the loss the Society had sustained in the death of one of its oldest members, Mr. John Hodgson, of Wakefield.—Mr. J. Wilcock, of Wakefield, at the request of the president, then introduced the subject of the conchology of the district. Within a radius of eight miles he stated he had collected during the last few years upwards of 195 species and varieties of land and fresh water shells. He considered the district very prolific, and though there had been a large number of species collected during the ramble, had the weather proved favourable, there might have been many more. He then named the specimens produced, amongst which were the following:—*Helix aspersa*, and its vars. *conoides* and *tenua*, *H. nemoralis*, vars. *hybrida*, *major* and *hortensis*, *H. virgata*, *H. caperata*, vars. *major* and *ornata*, *H. cantiana*, *H. hispida*, *H. pygmœa*, *H. pulchella*, *H. aculeata*, *Zonites stellaris*, *Z. nitidula*, *Z. fulvus*, *Clausilia rugosa* var. *tumidula*, *Pupa minutissima*, &c. The Rev. W. Fowler, M.A., of Liversedge,

was next called upon to report on the Magnesian Limestone formation, which he illustrated by organic specimens and chemical analysis, showing the different proportions of carbonate of lime and phosphate of magnesia in the Knottingley and Warmsworth limestone, the former containing the larger proportion of carbonate of lime, and the latter that of phosphate of magnesia. The plants, numbering upwards of 100, were then named by the Rev. W. Fowler, Mr. John Armitage, and Mr. R. Jessop. The series was of an interesting description, a large number belonging more particularly to limestone districts, amongst them being: *Centaurea nigra*, *Erigeron acre*, *Reseda lutea*, *R. luteola*, *Silene inflata*, *Carduus nutans*, *Conium maculatum*, *Sonchus asper*, *Filago germanica*, *Epilobium parviflorum*, *Origanum vulgare*, *Agrimonia Eupatoria*, *Torilis anthriscus*, *Echium vulgare*, *Senecio erucæfolius*, *Polygonum Hydropiper*, *Matricaria Chamomilla*, *Lycopus europæus*, *Malva sylvestris*, *Alopecurus geniculatus*, *Aira flavescens*, *Holcus lanatus*, *Sedum acre*, *Ballota nigra*, *Calamintha Clinopodium*, *Erysimum cheiranthoides*, *Inula dysenterica*, *Silaus pratensis*, *Thalictrum majus*, *Poa rigida*, *Pimpinella Saxifraga*, *P. magna*, *Verbascum Thapsus*, &c.—The geology of the district was treated upon by the Rev. W. Fowler, who described the various strata above the coal measures, comprising the lower red sandstone, the magnesian limestone, the lower red marl and gypsum, the upper slaty limestone, and the upper red limestone, &c.

DIARY.—MEETINGS OF SOCIETIES.

Sept. 1st.—Holmfirth Naturalists.

“ 2nd.—Wakefield ”

“ 4th.—Clayton West ”

“ 4th.—Mirfield ”

“ 4th.—West Riding Consolidated (Annual), Lecture Hall of
Literary and Scientific Society, South Street, Hud-
dersfield, at 5 p.m.

“ 6th.—Barnsley Naturalists.

“ 6th.—Stainland ”

“ 7th.—Liversedge ” (annual).

“ 11th.—Ripponden ”

“ 11th.—Paddock ”

“ 11th.—Huddersfield ” Paper by Mr. J. R. DORE.

“ 13th.—Rastrick ”

“ 18th.—Heckmondwike Naturalists.

“ 25th.—Ovenden ”

“ 27th.—Huddersfield ” Paper by Mr. J. E. PALMER.

N.B.—The Editors will be obliged if those gentlemen who have not already sent their Subscriptions, will be kind enough to do so; and any gentlemen desirous of subscribing should send their names without delay.

COMMUNICATIONS have been received from F. Buchanan White, M.D., F.L.S.; J. Wainwright, F.L.S.; J. Spencer; J. M. Barber; G. B. Corbin; York Field Naturalists' Society; Glasgow Field Naturalists' Society; and H. Franklin Parsons, M.D.

EXCHANGE.

DESIDERATA.—The following Lepidopterous larvæ are much wanted for figuring:—*Sinapis*, *Edusa*, *C. Album*, *Megæra*, *Alexis*, *Arion*, *Bombyliformis*, *Furcula*, *Bifida*, *Fagi*, *Cucullina*, *Dictæoides*, *Dromedarius*, *Chaonia*, *Dodonæa*, *Aceris*, *Auricoma*, *Hepatica*, *Scolopacina*, *Anceps*, *Albicolon*, *Furva*, and many others. Duplicates, various larvæ.—OWEN WILSON, Cwmffrwd, Carmarthen.

Nonagria fulva, *Cidaria populata*, *Acidalia inornata*, and others. Desiderata, numerous. Rev. G. C. B. MADDEN, Vicarage, Armitage Bridge, near Huddersfield.

TO CORRESPONDENTS.

The Editors will esteem it a favor, if the Secretaries of Field Clubs and Naturalists' Societies throughout the Kingdom will favor them with occasional Notes of their proceedings and Excursions, when of interest.

Papers read at Meetings of these Societies, or otherwise, on any branch of Natural History, will be gladly received and inserted in full, if of sufficient general interest, or in abstract, if of only local interest.

All communications, except Advertisements, Exchanges, or Short Queries, should, if possible, be in the hands of the Editors not later than the 18th of the current month, to insure insertion in our next issue, and should be written on one side of the sheet only.

N.B.—The Editors cannot undertake to return rejected papers, unless accompanied by a stamped addressed cover.

Natural History advertisements inserted on liberal terms.

All communications must be addressed to the Editors, care of Mr. B. BROWN, Publisher, Huddersfield.

NOTES ON ACENTROPUS NIVEUS.

BY G. B. CORBIN, RINGWOOD, HANTS.

ALMOST the bare mention of the name of Butterfly brings to our imagination something very pretty as well as fragile, and if we for a moment turn our thoughts to the places they inhabit, or their times of appearance, it requires no busy stretch of the fancy to associate these handiworks of the Creator with other things that are bright and beautiful in nature, such as woods, blooming heaths and moors, &c., &c., all touched with the magic wand of summer. Not perhaps in such a marked degree is this the case if we mention the name of Moth, for with it we may reasonably associate what in our homes is sometimes a source of inconvenience and trouble, and often considerable loss, where indeed everything composed of woollens, feathers, and the like, are subject to be destroyed, if not well looked after.

But the mention of Moth has a much wider meaning for some of us, and instead of staying at home to detect the ravages of our little winged enemies, we love to follow our allies to their dwelling-places, in wood and forest, on hill or bog, to the fields or sea shore, or indeed to wherever their varied homes may be; yet in many cases we surprise our friends by searching such "odd places," and many of them will scarcely credit that Moths are to be obtained by scanning such out-of-the-way nooks and corners; but every person who has paid a little attention to the subject is fully cognizant of the fact, and knows how infinitely varied are the habitations and modes of life of the creatures we call Moths. We, however, who dabble in the subject are often unprepared to receive the strange peculiarities which present themselves to our notice during the investigation of a subject, and many of us can quite believe that a Moth in its earlier stages of existence lived on the flowers of certain plants, the foliage of certain trees, as well as the pith and solid wood of the same, or even in the stem of the flags and rushes by the river's sedgy margin. All this, and much more, I say, we can believe, but when we are told that the earlier stages of a Moth are passed in the bed of the river, under the water, a smile of something akin to scepticism is, I am sure, pardonable; such, however, is the case with the tiny species of insect whose name stands at the head of this article. Well may some of our brethren express a doubt as to its identity with the order we call *Lepidoptera*; for myself I am quite willing to adopt the belief of the majority, who have assigned it a position in the above order.

For many years the species has been a bone of contention, or rather a source of argument for the entomological investigators of this and continental countries, and of late the subject has again become very prominent, from the fact of its being brought before the notice of the Entomological Society of London by no less a person than J. W. Dunning, Esq., whose paper on the subject will ever remain a monument of scientific knowledge and research, as well as a proof of the author's industry in working out his subject. I shall be indebted to this article, of which the author kindly sent me a copy, for some of my remarks, but as I have taken the insect, I can possibly speak with more freedom than a person who has never seen it alive.

In 1791, the French naturalist, Olivier, described an insect supposed to be identical with our own, and placed it in the order *Neuroptera*, amongst the caddis-flies (*Phryganea*), and his theory was adopted by our own Curtis and Stephens for many years after ; but in 1835, Professor Westwood expressed a doubt about the species belonging to the caddis-fly group, and in fact pronounced the insect to be *Lepidopterous*. From the above date to the present day there have been some persons who hold the caddis-fly theory, and others—much the larger number—who stick to the insect's *Lepidopterous* characteristics, all of which are fully explained and disposed of in Mr. Dunning's clever article, to which I refer my readers, if they wish to enter into the scientific depths of its history, and revel amongst the “dry bones” of our much loved pursuits.

It will, perhaps, be asked whether the caddis-fly or moth theory is best proved by the arguments adduced in the investigation, and also, whether the insect in question is such a connecting link between the two classes that it is with difficulty its separation from either is effected ? It is quite true that it has one or two peculiarities in common with the caddis-flies, as the aquatic habits of the larva, etc., but its Lepidopterous characteristics are many, in the possession of which it cannot reasonably be referred to the former group. The aquatic habits of the larva would speak in favour of the caddis-fly, more especially if it were the only instance of the kind we find amongst the Lepidoptera of Britain, but it does not stand alone, *C. Lennata*, *P. stratiotatis*, and the China-marks have all aquatic larvæ, and their claim to the Lepidoptera is seldom, if ever, questioned, and not only so, but the insect under consideration has many peculiarities which we look for in vain amongst the caddis-flies.

(*To be continued.*)

AN AFTERNOON WITH THE OVENDEN NATURALISTS.

THE NEW RAILWAY FROM HALIFAX TO BRADFORD.

By JAMES SPENCER.

AN excursion over the line of the new tunnel now making under Queensbury, from Netherton to Hole Bottom, on the Clayton side of the hill, yielded us some interesting facts. The great 52 yards fault at Netherton Bridge is followed, a little further on, by an anticlinal axis, where the grit rocks are seen to bend over on either hand. The entrance to the tunnel on this side is being excavated in the rough rock, which is here very hard and massive. It is overlaid by the seat earth and bed of coal which accompany this rock, wherever it has a good covering of shale, throughout its entire course from the North of England to the Midland Counties. The coal reaches two feet in thickness in some places in Lancashire, but in this district, and throughout a great part of its range, it is only about six inches.

In the *debris* from No. 2 shaft we found that well-known mineral, "cone-in-cone." It occurs in the strata between the Hard and Soft bed coals, and appears to have an extensive range, being found also in Shibden Dale, Southowram, and Elland.

It varies in thickness from one to six inches, but occasionally I have found it a foot or more in thickness. It is composed of a great number of cones fitting into each other, hence its name, "cone-in-cone." It almost invariably (in carboniferous rocks) occurs in connection with a layer of clay-ironstone, which generally underlies it. It has long been a disputed point as to whether it was of mineral or of vegetable origin ; but its mineral characters are clearly shewn in some beautiful microscopic sections which I have in my possession. It appears to be a peculiar form of crystallization, occurring in beds overlying clay-iron-stone in most of our coal fields. In the great South Wales coal-fields it is said to occur in connection with nearly every bed of iron ore. The same form of crystallization occurs in connection with other minerals, and is more extensively diffused in the earth's crust than was formerly imagined. In this neighbourhood I have found it in the Yoredale rocks of Hebden Bridge, in the Millstone-grit rocks, where it occurs in two beds, one in the shale upon the Kinder-grit, and the

other under the rough rock, and in the two places above mentioned, and in the Low Moor coal fields.

Here we found also, *Anthracosia*, or brackish water shells, *Goniatites Listeri*, *Aviculopectens*, and other shells and fish remains. It must not be supposed that the *Anthracosia*, though found in the same heap, came from the same bed as the *Goniatites* and *Aviculopectens*, for while the former lies below the Hard-bed coal, the latter lies on the top of that coal.

Passing over the hill and examining the *debris* at the mouth of each shaft, we found nothing of importance till we came to No. 6 shaft, where we found the "cone-in-cone" again, which had been derived from a considerably higher horizon than that referred to above. This fact was new to us, and it was clear that there are at least two beds of "cone-in-cone" in our Halifax coal strata. It appears to occur (judging from the depth of this shaft—50 yards) about 40 to 50 yards below the flag-rock. It occurs also at some distance above this rock, in the Low Moor coal strata. We also found *Anthracosia*, which appears to have come from nearly the same level as the "cone-in-cone."

The section exposed at the entrance to the tunnel at Hole Bottom, on the Clayton side of the hill, is a very instructive one. There, a fault crosses the line in a south-east and north-west direction, with a down-throw to the east, and accompanied by several minor ones. The dyke which divides the rocks is about a yard wide, and is filled with fragments derived from the sides. It forms part of the great fault which runs from near Bradford, by Clayton, to Denholme Gate, and north-westwards into the Millstone-grit country. It has a down-throw to the north-east at Clayton of about 73 yards, and at Denholme Gate of 150 yards or more.

The day was all that could be desired, and having spent a very enjoyable afternoon, we returned by Queensbury to the meeting-place, at the Queen's Head Inn, with our bags full of fossils.

At this meeting Messrs. Cockroft, Binns, and Spencer exhibited specimens, obtained since last meeting, chiefly during the afternoon ramble over Queensbury Tunnel, viz.:—fine specimens of cone-in-cone, from two different horizons in the shafts, *Anthracosia robusta* or brackish-water mussels, *Goniatites Listeri* (two varieties), *Nautilus Rawsoni*, *Orthoceras cinctum* (very large specimen), *Aviculopecten papyraceus*, *Possidonia Trigonix*, *Modiolopsis*, fish remains—bones, teeth, and scales. Plants: *Sigillaria*, *Stigmaria ficoides*, *Lepidodendron Harcourtii*, *Halonia regulare*, *Ulodendron minor*, &c.

RICCALL COMMON.

By W. DENISON ROEBUCK.

RICCALL Common is situated in the centre of the wide low-lying plain called the Vale of York. This vale has undoubtedly been produced by natural forces acting through a long series of years, wearing away the soft triassic or new red series of strata ; while the harder liassic, oolitic, and cretaceous strata of the East Riding, and the permian and carboniferous rocks of the West Riding, offering more resistance to the disintegrating forces, marine or sub-aerial, have been left standing out as hills and mountains.

This vale may be traced from the coast of Durham through Yorkshire and Nottinghamshire far down into the midland counties ; and into it are gathered the great rivers which, by their confluence, form the Humber. The Humber estuary has to escape from this vast inland basin by cutting its way through the three parallel ranges of hills formed by the outcrop of the lias, the oolites, and the chalk which bound it on the east. It is evident that a comparatively small obstruction to this outflow would convert this basin into a great inland lake ; and this, indeed, appears actually to have been the case. This lake, however, would in process of time become filled up by materials brought down by the rivers from above, and consequently we now find its site a wide alluvial plain, with a few little islets of trias rising out of it. The new red sandstone is reached at Cawood at a depth of about 100 feet. The lowest bed reached about Riccall is a strong brown clay of unknown thickness, which is met with at Cawood and Kelfield on one side, and at North Duffield on the other, and probably extends beneath the whole of the common. Above the clay is a bed of sand of variable thickness, which, owing to the retentive nature of the clay beneath, is waterlogged in its lower part so as to become a quicksand.

In repairing the tower of Riccall church, ten years ago, it was found that the Norman builders, in order to obtain a firm foundation, had thrown confusedly together into the quicksand a number of trees, upon which they had rested their tower. It is upon this wet sand that the rich flora of Riccall Common grows. There is a great similarity in the flora of Riccall Common to that of Thorne Waste, but at Riccall there are many sand-loving plants, such as *Plantago Coronopus*, which do not grow at Thorne Waste. At Thorne there is a thick bed of peat resting on the clay, while at Riccall the soil is sandy, but full of vegetable matter in its upper part.

The common is not quite 25 feet above the mean tide level. It is included in the parishes of Riccall and Skipwith, and is one of the largest unreclaimed pieces of land in England that are capable of improvement. The Enclosure Commissioners have now their eye upon this land with a view to its reclamation for agricultural purposes, and in a year or two it is not improbable that, like Troy, its place will be occupied by fields of waving corn.

The district to which so much interest, historical and archæological, attaches, is no less interesting in a natural history point of view; and on the last Bank holiday was appointed as the rendezvous of a large party of naturalists from Leeds, Goole, Snaith, Howden, Hull, Withernsea, and Beverley, representing three societies—the Leeds Naturalists' Field Club and Scientific Association, the Goole Scientific Society, and the Hull Scientific Association and Naturalists' Field Club.

Amongst the vegetation in the Selby Cut, Messrs. William Nelson and John W. Taylor, conchologists, obtained specimens of *Bythinia tentaculata*, *Valvata piscinalis*, a single dead shell of *V. cristata*, and numerous species of the genus *Planorbis*; while on the mud where the vegetation was absent numerous fine examples of *Paludina vivipara* occurred. In the canal was also to be found the fresh water sponge and numerous aquatic insects. A ditch that ran parallel with the canal proved to be quite choked with aquatic plants, and swarming with animal life, such as *Sphaerium corneum*, *Physa fontinalis*, and numerous others. Specimens were collected at intervals along the river banks, including microscopic fungi, plants, such as *Allium Scorodoprasum*, and various shells, including *Helix arbustorum* in abundance, and in a ditch *Ancylus lacustris*. The swift was noticed in plenty on the wing. Leaving the river banks at Barlby, the conchologists found a solitary individual of *Helix aspersa*, and other common species.

The first united meeting was held at half-past one, round the sign-post which stands in the centre of the common. Here luncheon was disposed of, and here were seen specimens which had been taken by various members on their different lines of route. Amongst these were very noticeable a pair of very fine lizards in the possession of Mr. S. Jefferson, F.C.S., of Leeds, who had taken them on the common. He had also grasshoppers, and the diadem spider (*Epeira diadema*). Numerous members had collected the plant of the locality—the beautiful and rare *Gentiana Pneumonanthe*—found on many parts of the common. At this time and place Dr. H. Franklin Pars ns,

secretary of the Goole Society, who, from his familiarity with the locality, had been requested to make the arrangements for the excursion, read a most interesting paper on the natural and archæological features and the history of the district. At the conclusion of Dr. Parson's address, Mr. Wm. Todd, a vice-president of the Leeds society, proposed, and Mr. E. Lamplough, of Hull, seconded a vote of thanks, which was carried by acclamation, after which the excursionists dispersed.

The botanists, including Dr. Parsons, Dr. F. Arnold Lees, F.L.S., Mr. Todd, and Mr. Abbott, went eastwards towards Skipwith. They verified the habitat of *Mentha Pulegium*, and saw a solitary root of the royal fern, which, with a view to prevent extermination, was not disturbed. Mr. Lees killed a viper on the heath, some two or two-and-a-half feet in length. The zoologists proceeded westwards towards Riccall, making their way to a series of roadside ponds near the Vicarage. Here in one little pond they found four species of duckweeds—*Lemna minor*, *L. gibba*, *L. trisula*, and *L. polyrhiza*, the latter sometimes attaining to the large size of half an inch in diameter. The shells from these ponds included numerous examples of *Limnæa stagnalis*, and various species of *Planorbis*; while the close vicinity of a tidal river was shown by the occurrence of the maritime dock (*Rumex maritimus*). A deep drain near these ponds, communicating with the Ouse, and consequently filled with brackish water at every upflow of the tide, abounded in young eels, and also produced numerous young flounders or flat fish. Numbers of both fishes were caught by Mr. John Grassham, for the benefit of the aquaria in the possession of various members, and more especially for the aquaria at the Yorkshire Exhibition.

At five o'clock, by appointment, the members assembled at the Parish Church of Riccall, and were cordially received by the Vicar, the Rev. J. R. Farrow, who most kindly favoured them with an address on the architectural history of the building.

A large number of plants were collected during the day by the botanists. The conchologists reported the absence of numerous shells which they might reasonably have expected to meet with, such as *Helix rufescens* and *H. hispida*, and explained the smallness of their takings by the fact of the weather being warm and dry, and consequently unfavourable to the appearance of land snails. *Hipparchia tithonus* was the best butterfly seen, while of other insects few were collected. A larva of some unknown species of *Acronycta* was taken by Dr. Parsons and Mr. Lees.

Among other plants found I may mention the buckbean, the butterwort, *Radiola millegrana*, a tiny little plant like a miniature flax; *Littorella lacustris*, *Scirpus fluitans*, and *Anagallis tenella*. The fir trees which surround the common have, many of them, and perhaps all, been planted, but there can be no doubt that the Scotch fir is a native of this part of England, for its cones are often found deep in the peat which underlies the neighbourhood of Goole. Of ferns, *Nephrodium spinulosum* occurs plentifully on the common, but a greater variety may be found in the shady lanes and woods which surround it. *Osmunda regalis* grows near Skipwith, if the selfish rapacity of collectors has not exterminated it. *Pilularia globulifera*, a strange little plant, with creeping stems, bristle-like leaves, curled up when young like those of a fern, and fruit like peppercorns, grows on the borders of some of the ponds. Of mosses the chief are:—*Sphagnum*, two or three species; *Dicranum heteromallum* and *D. Scoparium*, *Campylopus densus*, *Leucobryum glaucum*, *Aulacomnium palustre* (which may be found in fruit); and *Hypnum Schreberi* and *H. Scorpioides*. The following lichens are abundant among the heath on the common: *Cladonia coccinea*, *C. rangiferina* and *C. uncialis*, *Cetraria aculeata*, *Platysma glaucum*, and *Parmelia physodes*. Lichens and mosses are generally scarce in the dry climate of Eastern Yorkshire, and I know nowhere else in the neighbourhood where so many may be found. Agarics and other fungi may be found plentifully in the fir groves at the eastern end of the common.

The whole of the excursionists arrived safely at home much pleased with the day's enjoyment and the kindness experienced on all hands, and shared in the hope that the reunion would not be the last occasion on which they might meet together.

Leeds, September, 1875.

Short Notes and Queries.

On the 6th instant I took a nice specimen of *Sphinx convolvuli* hovering over some petunias.—(Rev.) G. A. SMALLWOOD, Barrow-on-Trent, Derby, Sept. 8th, 1875.

A specimen of *Sphinx Convolvuli* was captured in Woodhouse Lane, Leeds, last week.—EDWIN BIRCH-ALL. Leeds, Sept. 14th, 1875.

Last night, I took a solitary specimen of *Euperia fulvago* near here. It is quite new to the district.—JOHN HARRISON, 7, Victoria Bridge, Barnsley, Sept. 9th, 1875.

Mr. John Harrison tells me that two specimens of *Lithosia quadra* have been taken at sugar near Barnsley, this season. This makes the third Yorkshire locality for this hitherto southern species.—GEO. T. PORRITT.

VANESSA ANTIOPA.—On the 5th inst., I had the good fortune to secure a specimen of *Vanessa Antiopa*, at Edlington. It is a good specimen, except a snip in the right hand wing. Two men catching *V. Atalanta*, *Io* and *G. Rhamni*, had it pinned sidewise in a paper collar box, and did not exactly know what it was.—JOHN HARRISON, 7, Victoria Bridge, Barnsley, September 7th, 1875.

ORCHIDACEÆ.—The following is a list of these very favourite plants to be found in the immediate neighbourhood of Alresford, which is situated almost at the extreme south of the country, and I should very much like to compare notes with other botanists, especially those of northern districts. The subsoil here is mostly chalk. *Orchis Morio*, *O. ustulata*, *O. latifolia*, *O. maculata*, *O. Conopsea*, *O. fffolia*, *O. Mascula*, *Neottia nidusavis*, *Listera ovata*, *Epipactis grandiflora*, *Ophrys apifera*, *O. muscifera*.—J. ANDERSON, Jun., Alresford, Hants.

Reports of Societies.

BRADFORD NATURALISTS' SOCIETY.—On Monday evening, Aug. 30th, a few lovers of natural history met at the Northgate Hotel, Bradford, for the purpose of establishing a society that should have for its objects the acquisition and diffusion of knowledge in the various branches of natural history, by means of books, papers, rambles, and the exhibition of specimens in botany, geology, entomology, ornithology, &c. The officers were elected and meetings

fixed for the ensuing year. After the remaining business had been transacted, beautiful specimens of the larvae, pupæ, and imago, of *Smerinthus populi* (poplar hawk moth) were exhibited by Mr. J. W. Carter.—The second meeting of this Society was held on Monday evening, Sept. 6th, at the Northgate Hotel. The President, Mr. John Carter, occupied the chair. The first business, after the minutes of the last meeting had been read, was a resolution to join the West Riding Consolidated Naturalists' Society, that body having resolved at their recent annual meeting, held at Huddersfield, to accept the Bradford Society. The secretary, Mr. J. W. Carter, was instructed to forward the required information so as to secure consolidation as early as possible. Five new members were admitted, and the nucleus of a library formed, through the liberality of Messrs. J. Firth, J. Carter, J. W. Carter, and H. Andrews, members of the Society, who presented works on lepidoptera, geology, and botany. It was resolved to purchase Newman's "British Moths and Ferns." After the remaining business had been transacted, several beautiful specimens of lepidoptera were exhibited, including *Papilio Machaon*, *Gonepteryx rhamni*, *Colias edusa*, *C. hyale*, *Pieris crataegi*, *P. brassicæ*, *P. rapæ*, *P. napi*, *P. daplidice*, *Anthocharis cardamines*, *Leucophasia sinapis*, *Crocallis elinguaria*, *Cidaria russata*, and the larvæ, pupæ, and imago of *Pygæria bucephala*, which were exhibited by Messrs. J. Firth, J. W. Carter, and H. Andrews.

GLASGOW FIELD NATURALISTS' SOCIETY.—On Tuesday evening, August 17th, the Society held its usual fortnightly meeting in the Andersonian University, when Mr. James Allan, vice-president, occupied the chair. In his report concerning the very pleasant and profitable excursion to Ben Voirlich, Dr. Stirton said that he had found a lichen never before observed in this country, but which had yet to be named. He will exhibit it at a future meeting. Mr. Watt discovered the rare *Sibbaldia procumbens* on the mountain. The following scarce plants found in this locality should be recorded:—*Luzula spicata*, *Cerastium alpinum*, *Lycopodium annotinum*, *Aspidium Lonchitis* (previously recorded, but very rare), the moss *Campylopus Schwarzii* (first found there), and *Dydymodon daldeana*. Glacial markings were very plainly seen on the boulders of the hill, and especially on those on the side of Loch Sloy. Mr. Noble exhibited a variety of shells from Moreton Bay, Queensland; and Mr. King, marine shells from Rio de Janeiro and Valparaiso, also a collection of butterflies and beetles from Chili. Mr. Patterson laid upon the table the rare bird's nest fungus *Clathrus cancellatus* from the south of Ireland. This is the first time it has been found in Britain. A similar species is found in New Zealand. He also exhibited a number of scarce plants from the Gareloch, among which may be named *Lathraea squamaria*. Mr. Renwick showed the small plant *Malaxis paludosa*, which he found at Lochwinnoch. It has not been

previously reported from that district. Mr. M'Kay laid before the meeting an interesting series of rare British plants. The next excursion was announced to take place on August 28th to Kilsyth Glen.

MEETING, 31st August, Mr. Jas. Allan, vice-president, in the chair. The chairman gave an account of the excursion to Kilsyth Glen on the previous Saturday. He stated that no flowering plants worth recording had been found, but that *Asplenium viride* had been got in considerable abundance.—Mr. R. H. Paterson reported that he had found the very rare fungus *Coprinus Hendersonii* at this excursion. He exhibited a collection of fac-similes of ferns and club-mosses printed from the plants themselves. He also mentioned that he had found the fungus *Saprolegnia ferax* growing on a fresh-water snail *Limnaea peregra*. This is a curious example of what may be called an amphioxous fungus, as it is quite undistinguishable from *Sporendonema muscae*, the fungus which grows on and is supposed to cause the death of the common house-fly.—Mr. Alexander Macindoe reported the following plants from the neighbourhood of Maryhill:—*Lychnis Githago*, *Linum usitatissimum*, *Cichorium Intybus*, and *Sisymbrium Sophia*.—Mr. W. J. Milligan then read a paper on “The Theory of Spontaneous Generation.”

GOOLE SCIENTIFIC SOCIETY.—The September excursion of this Society was made on the 11th of

September, to Snaith; the Rev. H. Rees, vicar of Snaith, kindly acting as *cicerone*. The chief interest of this excursion was antiquarian, and but little of natural history of any importance was undertaken, *Cerastium aquaticum* being the least common plant observed. A few *fungi* of common kinds were seen, but plants of this order seem particularly scarce this season.—H. FRANKLIN PARSONS, Secretary.

HECKMONDWIKE NATURALISTS' SOCIETY.—An ordinary meeting of the Heckmondwike Naturalists' Society was held in the usual meeting room, at the house of Mr. Jas. Robinson, on Saturday evening, Aug. 21st, the vice-president, Mr. J. M. Barber, in the chair. The preliminary business of the Society, comprising the reading and confirming of the minutes of the last meeting, the reading of correspondence and reports of kindred societies, the admittance of new members, and the financial transactions having been disposed of, a number of specimens lying on the table, brought by various members, were exhibited and described. Amongst them were a ringed snake with its cast-off skin, some specimens of geology, zoology, and botany, &c.

HUDDERSFIELD NATURALISTS' SOCIETY.—An ordinary meeting was held on the 30th August, Mr. G. T. Porritt, F.L.S., in the chair. It was resolved that Whitley should be proposed at the annual meeting of the West Riding Consolidated

Naturalists' Society, as a suitable place for an excursion next season. Wessenden was also mentioned. The president announced that the room and library of this Society will be open every Wednesday evening from eight to ten, for the purpose of reading, comparing specimens, &c., but no books are to be taken away. Mr. S. L. Mosley exhibited a *Rubus*, in which the leaflets were much divided, and more like the leaves of the hawthorn than the ordinary form. Mr. Hobkirk suggested that the plant looked like a cross between *Rubus* and *Crataegus*.—Mr. Taylor exhibited "sports" of *Polypodium Dryopteris* and *Cystopteris fragilis*. There was also a collection of exotic ferns, exhibited by Mr. J. Tindall from Mr. Pontey's nurseries. In entomology, specimens were exhibited by Messrs. Porritt, Mosley, and Noble. Mr. Mosley showed a drawer from his cabinet of butterflies, with the larvæ mounted on the food plant, and showing specimens in natural positions. At Blackpool and Fleetwood Mr. Mosley had taken *Sphinx Convolvuli*, a splendid variety of *Lycæna alexis*, *Agrotis valigera*, *Agrotis tritici*, and others. Mr. Porritt exhibited *Stilia anomala* and *Crambus geniculellus* taken by himself in the Isle of Man about a fortnight previously. He had also taken larvæ of *Dianthæcia cæsia* and *capsophila* from the *Silene maritima* on the cliffs.—Mr. Hobkirk read a paper on "Some apparent Anomalies in Natural History." After detailing and showing the older definitions between animals and plants, he showed that lately the

term "protoplasm," the basis of life, the constituent of all cells, had been much used. An axiom had been promulgated that plants are capable of uniting the elements carbon, nitrogen, hydrogen, and oxygen, to form protoplasm for their cell growth, but are not able to use protoplasm itself without it first being decomposed, while animals require protoplasm itself for their nourishment, and are not able to use its constituent elements. This axiom was satisfactory until the recent publication of Mr. Darwin's "Insectivorous Plants," in which he proves that *Drosera* and many other plants feed on animal food, such as flies, &c., and therefore on protoplasm as such (detailing several of Darwin's experiments)--thus showing that we are still without a rigid definition to distinguish animals from plants.

MEETING, September 11th.—A goodly number of members were present. Mr. T. H. Bartlam named an extensive collection of botanical specimens, and also called attention to the specimen of *Rubus* exhibited by Mr. Mosley at the last meeting of the Society. He said that to him there was a great objection to considering it as a hybrid between a bramble and a thorn, inasmuch as one flowered several months before the other. In answer to Mr. Tindall, he pointed out that the pollen had the power of fertilization, and the difference of fruit was no objection at all. He (Mr. Bartlam) considered it far more likely to be a cross between a bramble and *Sambucus nigra*, var. *dissectum*, which

plant grows close beside the bramble in question.—Mr. Tindall showed a piece of cannel-coal containing shells of the genus *Cucullia* from West Ardsley.—The president named some beautiful specimens of preserved larvæ sent to him by Lord Walsingham, and some exhibited by Mr. Mosley. They were *Emmelesia decolorata*, *Trichiura Cratægi*, *Diloba coeruleocephala*, and *Hadena thalassina*. Mr. Porritt also called attention to the new cabinet the Society had purchased, and Mr. Mosley was instructed to prepare it for the specimens.—Mr. J. Varley read a paper on "The Migration and Instinct of Birds." He showed the accuracy with which birds calculate the time for their departure from one place to another; the peculiar manner of feigning lameness; their various habits prior to a change in the weather; their different habits at certain times of the year; the adaptation of their bills, feet, and wings to their different modes of life; their nesting, &c.; and particularly called attention to a wild duck's nest which he, along with others, had found some years since at Sherwood Forest, situated in a tree five or six yards from the ground. Some discussion followed, in which Messrs. Porritt, Mosley, Conacher, and others took part, after which the meeting closed.—S. L. MOSLEY, Prov. Sec.

THE LEEDS NATURALISTS' FIELD CLUB AND SCIENTIFIC ASSOCIATION.
—187th Meeting, Sept. 1st, 1875,
Mr. Henry Pocklington, F.R.M.S.,
president, in the chair. Mr. Chas.

Smethurst exhibited *Erebia blanda*, from Upper Wharfedale, and *Hydrcia petasitis*, from Stanley—both taken by him this season.—Mr. Walter H. Hay showed a specimen of *Sirex gigas*, taken by him, flying down Briggate ; Mr. John Grassham showed local specimens of *Gonepteryx rhamni*, bred examples of *Ennomos fuscantaria*, and a very good variety of *Crocallis elinguaria*, which he had recently taken on a lamp-post near Adel.—Mr. Samuel Schofield showed a number of insects taken at Barwick-in-Elmet ; also several plants, including *Actaea spicata*, Parlington Wood ; *Chelidonium majus*, Aberford ; *Parnassia palustris*, near Parlington Park ; *Pulycaria dysenterica*, and *Viburnum Opulus*.—Mr. Edwin Birchall, F.L.S., exhibited a number of lepidoptera collected by himself at Rannoch this season, including *Zygæna exulans*, var. *vanadis*, *Erebia cassiope*, *E. Blandina*, and numerous others.

188th MEETING, Sept. 8th, the president in the chair. Mr. Benj. Holgate read a paper on "The Combustion of Bituminous Coal," which he illustrated by means of numerous examples of coals and cokes, and diagrams of various makes of furnaces. The discussion was joined in by the president, Mr. S. Scholefield, Mr. Edward Thompson, Mr. James Malt (secretary of the Leeds Geological Association), Mr. James W. Westmoreland, A.R.S.M., and the lecturer.

189th MEETING, Sept. 15th, the president in the chair. Mr. Wm. Nelson exhibited a number of

specimens of the various forms assumed by the varieties of *Limnæa peregra*.—Mr. John W. Taylor showed some species of *Cylindrella*, which is almost entirely confined to the West Indies, and is remarkable for nearly all the species losing the top whorls, and thus becoming decollated. As the animals attain maturity, they desert the upper whorls, which thereupon almost invariably break off. *C. rosea*, from Jamaica, lives on the ground amongst dead leaves ; *C. lateralis*, from Cuba, is remarkable for the detached tube into which the last whorl is prolonged, and is found attached to the face of walls and rocks. *C. elongata* differs from the others in its pure white colour, reversed volution, and viviparous character, and feeds on the lichens clothing the rocks on which they dwell ; while *C. Maugeri* is remarkable for its smooth polished surface, and lives on the trunks of trees in Jamaica.—Mr. E. E. Prince showed various specimens, including the cast skins of the lizards which had been taken at Riccall Common on the 2nd August. Mr. S. Scholefield showed various plants collected within the West Riding district.—Mr. James Abbott exhibited a plant new to the county—*Potentilla Norvegica*,* which grows abundantly on the banks of the Leeds and Liverpool Canal, between Armley and Kirkstall, and is apparently naturalised. It was first noticed about 1860, by Mr. Wm. Kirkby, of Leeds, and at that time neither he nor Mr. Abbott was able to make it out. In 1868 it was found, apparently native, in Burwell Fen,

* This Plant was found in 1873, on the banks of the same Canal, close to Huddersfield.

Cambridgeshire, by Mr. G. S. Gibson. Mr. Abbott again noticed the plant in 1874, and in 1875 he forwarded specimens to Kew, when it turned out to be the above plant. It will thus be seen that Mr. Kirkby and Mr. Abbott have the credit of discovering this plant in the British Isles. Mr. Abbott also showed *Rumex maritimus*, *Pilularia globulifera*, *Mentha pulegium*, and *Equisetum hyemale*, from Riccall Common, *Senecio Saracenicus* from Weetwood, *Bidens cernua* from Selby, and *Radiola millegrana* from Adel Bog : on behalf of Mr. Christopher Pocklington :—*Senecio campestris*, *Convolvulus Soldanella*, *Ophrys arachnites* from the south of England, and from Mr. W. K. Gill, of Parkstone, Dorset, *Cuscuta epithymum* on *Erica* and furze ; also *Œnanthe crocata*, a poisonous plant often taken in error for parsnip, and other specimens. Mr. Abbott recorded the capture of *Colias edusa* on the 5th September, near Adel Dam. Other members mentioned that *Vanessa Antiopa*, now in the possession of Mr. C. W. Liversedge, was taken near Kirkstall Road, about a fortnight ago.

LIVERSEDGE NATURALISTS' SOCIETY.—The annual meeting of the above Society was held on Tuesday, September 2nd, in Millbridge School, the Rev. W. Fowler in the chair. Plants were exhibited by Messrs. Rothery, Tattersall, and Barber ; and fossils and other rock specimens from the Drift of Holderness, by Mr. Rothery. Mr. Adamson handed round a tray of eggs, including those of the guille-

mot and razor-bill, and Mr. Banks a number of lepidoptera taken at Southport. A specimen of the common snake preserved in spirit, was exhibited by Mr. Neville. It appeared from a statement made by the secretary that the society is in a flourishing condition, having 57 members this year against 40 last ; and £4 in hand, though 20 volumes have been added to the library during the year. The officers were then chosen for the year ensuing, Rev. W. Fowler, M.A., being re-elected president.

MIDDLESTOWN NATURALISTS' SOCIETY.—The usual monthly meeting of this Society was held on Saturday evening, September 11th, in the National School-room, the Rev. H. Greene, president, in the chair. Mr. Geo. Jackson exhibited a number of lepidoptera taken by himself in the district, including *Catacola fraxini* (this, he noted, was the first he had known to be taken in this district), *Metrocampa margaritata*, *Thyatira batis* and *derasa*, *Xanthia citrago*, *Gonoptera libatrix*, &c. This Society being mostly composed of young naturalists, it was resolved to hold evening classes during the coming winter for the study of botany and geology.

J. SEWELL, Hon. Sec.

[Mr. Jackson states that this specimen of *C. fraxini*, alluded to above, was taken on the 12th of August last in Stonycliffe Wood : he found it resting on an elm tree, four or five yards from the ground, in the morning, and not being prepared to take it, left it until afternoon.—*Eds. Nat.*]

WAKEFIELD NATURALISTS' SOCIETY.—The usual monthly meeting of this Society was held on Thursday, Sept. 2nd, Mr. Sims, vice-president, in the chair. After the usual introductory business, the corresponding secretary read several communications from patrons, &c., after which Mr. Wilson exhibited the following insects:—*E. apicaria*, *Z. Æsculi*, *L. Monacha*, and *H. dysodea*. Mr. Sims also exhibited specimens of *E. pimpinnellata*, *E. subnotata*, *C. fluctuosa*, *H. Petasitis*, *H. Chenopdii*, *H. Genistæ*; also a remarkable variety of *N. augur*. Mr. Hall exhibited some very large specimens of *V. Io*. After some conversation, the meeting closed with the chairman drawing attention to the annual meeting of the West Riding Consolidated Naturalists' Society, to be held at Huddersfield, on Saturday, the 4th.—W. TALBOT, Corresponding Secretary.

WEST RIDING CONSOLIDATED NATURALISTS' SOCIETY.—The annual meeting of the Societies in this Union was held on Saturday, September 4th, in the Lecture Hall of the Literary and Scientific Society, Huddersfield, the vice-president, Mr. Geo. T. Porritt, F.L.S., occupying the chair. An interesting address was given by the chairman, in which he reviewed some of the work done by the Society during the past year, and then threw out some valuable suggestions as to the future conduct of their meetings and excursions, and concluded by some observations in which he criti-

cally examined a statement which appeared in a recent issue of one of our contemporaries, which took a very gloomy view of scientific work in England, which was said to be rapidly coming to a stand-still. The chairman could not agree at all with this view, and was convinced from many observations which he instanced that "there never was so deeply rooted a love for science, and for the abstruse parts of science too, as there is to-day; there never were so many men who were determined to unearth, not only everything above but everything under ground; there never was such an intense craving after the truth of things as at this moment." The Secretary then read a statement of the finances of the Society, showing a small balance to credit. The election of officers for the ensuing year was next proceeded with, Mr. J. Wainwright, F.L.S., of Wakefield, being re-elected president; the Rev. W. Fowler, M.A., of Liversedge, vice-president; and Mr. J. M. Barber, of Heckmondwike, was again unanimously re-elected secretary. The selection of excursions resulted in the following:—Garforth on Easter Monday, Coxley Valley in May, Askern on Whit Monday, Elland in July, Honley in August, Whitley Lower in September, and the annual meeting in October at Mirfield. A Naturalists' Society recently formed at Bradford made an application to be admitted into the Union, which was unanimously agreed to. After tea, a number of specimens collected during the day were laid on the table. The botanical specimens were named by Messrs. R. Jessop and J.

Bartlam, and amongst them were the following :—*Narthecium ossifragum*, *Asplenium viride*, *Erica tetralix*, *Vaccinium Vitis-Idaea*, *Hypericum humifusum*, *Wahlenbergia hederacea*, *Drosera rotundifolia*, *Rubus Chamæmorus*, *Cystopteris fragilis*, *Eriophorum angustifolium*, *Echium vulgare*, &c. Mr. H. Sims, of Wakefield, exhibited the following lepidoptera :—*Eupithecia linearis*, *Eupisteria heparata*, *Epione apiciaria*, *Xylophasia polyodon* (black var.), *Cymataphora fluctuosa*, *Dianthæcia capsincola*, *Apamea gemina*, and *Hadena chenopodii*, all from the neighbourhood of Wakefield. The meeting was brought to a close a little after eight o'clock by the usual votes of thanks, after which a few of the members were invited by Mr. Porritt to his house for an examination of his splendid collection of lepidoptera. The following Societies were represented at the meeting :—Huddersfield, Heckmondwike, Barnsley, Wakefield, Ovenden, Holmfirth, Liversedge, Rastrick, Mirfield, Honley, Middlestown, and Paddock.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—The usual meeting of this Society was held on Wednesday evening, the 11th of August, at the house of Mr. Prest, Holgate Road, Mr. Simmons in the chair. Mr. Dutton exhibited *Lithosia quadra*, *Asthena Blomeraria*, taken at Helmsley, also *Pemphelia palumbella*, *Scoparia basistrigalis*, and *Sarrothripa revayana*. Mr. Helstrip showed a fine example of the Ruffled Bustard, from East Indies; Mr. Robinson, *Calligenia miniata*, *Crambus Selasellus*, *Phycis*

roborella, *Depressaria liturella*, and a fine variety of *Arctia lubricipedata*; the secretary on behalf of Mr. Frost, a fine specimen of *Sphinx Convolvuli*, taken at rest on the Cemetery Road. It is somewhat remarkable that another specimen of this rare *Sphinx* was taken at rest the following day in Buckingham Street, quite in the middle part of York. Also, *Lithosia quadra*, taken in Askham bog, and new to our district; *Phycis betulella*, also new to York; *Agrotis rorida*; *Orthosia suspecta*, taken at sugar; and *Ephyra orbicularia*, bred from the egg. After an interesting discussion, the meeting separated.—WM. PREST, Hon. Sec.

Extracts from Correspondence.

To the Editors of the Naturalist.

—Dear Sirs: On page 32, line 6 in the second column, of your last issue, I am reported as having shewn “the different proportions of carbonate of lime and phosphate of magnesia in the Knottingley and Warmsworth limestone.” Will you kindly allow me to say that “phosphate” ought to be “carbonate”? My mention of phosphate of ammonia as a test for magnesia probably caused the confusion. The last line in the same column should be removed altogether, such a rock as “the upper red limestone” never having been mentioned.—I am, gentlemen, yours truly, W. FOWLER.

—[H. PAYNE—Our correspondent will observe that the error he so kindly points out is also corrected by the author of the paper.—*Eds. Nat.*]]

DIARY.—MEETINGS OF SOCIETIES.

- Oct. 2nd.—Clayton West, Mirfield, Honley.
,, 4th.—Barnsley, Bradford, Birkby, Stainland, Todmorden.
,, 5th.—Liversedge.
,, 6th.—Holmfirth.
,, 7th.—Wakefield.
,, 9th.—Huddersfield Naturalists'—(Paper by Mr. SAMUEL D. BAIRSTOW); Ripponden, Middlestown, Paddock.
,, 11th.—Rastrick.
,, 13th.—Leeds: Exhibition of specimens, and conversation.
Goole : History and construction of the Microscope—Mr. HUNTER.
,, 16th.—Heckmondwike, Honley.
,, 18th.—Birkby, Bradford.
,, 20th.—Leeds: Paper.
,, 23rd.—Paddock.
,, 25th.—Huddersfield Naturalists'—Paper by Mr. G. T. PORRITT, F.L.S.
,, 27th.—Leeds: Exhibition of specimens, and conversation.
,, 30th.—Ovenden, Honley.
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THE NATURALIST is published on the first of every month ; Subscription, 4/- a year, payable in advance.

N.B.—The Editors will be obliged if those gentlemen who have not already sent their Subscriptions, will be kind enough to do so ; and any gentlemen desirous of subscribing should send their names without delay.

COMMUNICATIONS received from H. Franklin Parsons, M.D. ; Rev. G. C. B. Madden ; Charles Linney ; Joseph Anderson, Junr. ; Manchester Scientific Association ; Rastrick Naturalists' Society ; Birmingham Natural History and Microscopical Society ; Ovenden Naturalists' Society, &c.

EXCHANGE.

DESIDERATA.—*Z. Exulans*, the northern variety of *Auroraria*, and many northern species. Duplicates.—*Quadra*, *Apiciaria*, *Obeliscata*, *Russula*, *Turca*, *Serena*, *T. Quercus*, *Adippe*, *Aglaia*, *Rhamni*, *Plumigera*, *Tipuliformis*, *Pimpinellata*, *Trisignata*, *Centaureata*, &c.—J. ANDERSON, Junr., Alresford, Hants.

DUPLOCATES.—Pupæ of *P. Machaon*, Imagos of *A. Adippe*, *A. Selene*, *T. Quercus*, *L. Dispar*, *Egon*, *T. Rubi*, *P. Sylvanus*, and others. Desiderata.—*M. Athalia*, *M. Cinxia*, *G. C.-album*, *E. Blandina*, *T. Betulae*, *C. Plantaginis*, *M. Bombyliformis*.—H. T. PRESTON, Riversfield, Catton, Norwich.

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NOVEMBER, 1875.

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B. BROWN, MARKET PLACE CORNER.

TO CORRESPONDENTS.

The Editors will esteem it a favor, if the Secretaries of Field Clubs and Naturalists' Societies throughout the Kingdom will favor them with occasional Notes of their proceedings and Excursions, when of interest.

Papers read at Meetings of these Societies, or otherwise, on any branch of Natural History, will be gladly received and inserted in full, if of sufficient general interest, or in abstract, if of only local interest.

All communications, except Advertisements, Exchanges, or Short Queries, should, if possible, be in the hands of the Editors not later than the 18th of the current month, to insure insertion in our next issue, and should be written on one side of the sheet only.

N.B.—The Editors cannot undertake to return rejected papers, unless accompanied by a stamped addressed cover.

Natural History advertisements inserted on liberal terms.

All communications must be addressed to the Editors, care of Mr. B. BROWN, Publisher, Huddersfield.

Original Articles.

NOTES ON ACENTROPUS NIVEUS.—*Concluded.*

By G. B. CORBIN, RINGWOOD.

Let us see: the wings of Acentropus are clothed with scales—whence the name of the order to which it is now generally referred. This fact, alone, however, does not prove its identity, as some coleoptera have scales on them—and so have gnats, &c.,—upon their wings; so that even the term “lepidoptera” for butterflies and moths, does not describe them to the exclusion of all other classes of insects. Again, Acentropus has what are called “thoracic tippets,” which are appendages on each side of the thorax of the insect, at the base of the wings above. This peculiarity, too, does not hold good in *every* lepidopterous insect; furthermore, Acentropus has a bristle at the base of the hind wing, erect hair scales at the base of the fore wings on the under side. The position of the wing veins, and the formation of the mouth (though tongueless), all point to a typical lepidopterous character rather than to the *phryganidæ*. Other more minute peculiarities pointing to the same conclusions might be adduced, but let the above suffice. One other fact, however, I have noticed, and cannot pass over—viz., when the insect is at rest, the antennæ are folded back over the thorax, similar to a habit of the whole moth family, as far as I have observed; but when a caddis-fly is at rest, these organs are pointing directly forward.

So much, then, for some of the characters which our insect possesses in common with the lepidoptera; but it has other peculiarities in which it differs from both the lepidoptera and phryganidæ. Take its flight, for instance. As a rule it never seems to leave the water—(though I have seen one or two flying several feet above the surface)—but flutters its tiny wings very rapidly, and darts about like a swimming creature in circles here and there, its feet touching the surface through the whole movement. Again: dip a moth or caddis-fly into the water, and on taking it out, see what a caricature of its former self it presents; it is not so, however, with Acentropus, as I have seen it with only just its head above the surface, or in such a position that each ripple of the water immersed it. A ducking seems to do it little or no harm. Flying so close to the water, or settling on the wet mud at its margin, it is not an easy insect to take in the evenings, when on the wing; but in the daytime it is very lethargic, and soon dies when removed from the proximity of water.

Thus we see that *Acentropus*, though so small, has several characteristics peculiarly its own ; yet it seems to claim a closer kin to the moths than to any other class of insects. If we allow that such is the case, even then only half the difficulty seems to be disposed of ; for where, in that vast assemblage, shall a proper place be found for it ? Opinions differ, or have differed, as much on this point as on the other. One person holds that the little tongueless creature should belong to the tongueless group of *Bombyces* ; another opinionates that the *Crambites*, and another that the *Tineina*, is the proper group to which it ought to be referred ; whilst a fourth positively asserts that it can be placed only in the *Pyralides*, along with the other moths whose larvæ are aquatic, and accordingly here we find it in our systematic lists ; but most of the writers on the nomenclature of this insect express a belief that a separate family should be set apart for it, in whatever group it is placed. I am not scientific enough to offer an opinion on the subject, but, considering all things, the *Pyralides* is to me as natural a class as any in which to set it down. And even with this disposal we have not arrived at the end of our argument, or used up all the materials which offer themselves with regard to our insect or insects, as the case may be. The moths of the genus *Acentropus* seem to have a very extended range, as far as its European habitats are concerned. France, Holland, Germany, Switzerland, and parts of the Russian empire, yield specimens, and yet the insects appear to be local in this and other countries. I am led to believe that from its small and insignificant appearance it is often overlooked, and that it will eventually be found more common than is generally supposed, for its food-plants—the various species of water weeds of the generic term *Potamogeton*—are not rare in rivers where the insects have not hitherto been reported as occurring.

In our list of British moths we have two species assigned to the present genus, viz., *niveus* and *latipennis*. I take the insect at the head of this article to be the former of the two, since we are told that the females of *A. latipennis* found in the river Trent are apterous ; yet some Continental females of what is supposed to be the same species are amply winged. The specimens I take differ somewhat in the form of the wings—some are more lanceolate than others ; but I do not know that any specific difference is to be established therefrom, as all the specimens are found together, and appear to have the same habits. To Mr. Dunning's article I am indebted for much of the information I have given, and he is of opinion that all the so-called species, both British and Continental—(and there are ten, viz.,

*Nivea, Nivosa, Hansoni, Garnonsii, Niveus, Nevæ, Latipennis, Badensis, Germanicus, Obscurus)—are but local varieties of one and the same species, for which he retains the name *niveus*. It is quite certain that several of the above names are synonymous, and in one or two cases the male and female have had distinct specific names assigned to them, even with those so-called species whose separation seems to be a much easier task, since the females differ. There arises this difficulty, that the males, if placed together and mixed, are inseparable; so that Mr. D.'s conclusion is not to be spoken lightly of until we have more positive data on which to found an argument. The larvæ possibly would settle it, but from the few vague descriptions given, they seem to resemble each other in a remarkable degree. I am, therefore, quite willing to accept the oneness which Mr. Dunning's investigations have elucidated, and Mr. McLachlan, after a careful microscopic examination of the sexual organs (so specifically different in the caddis-flies) of specimens from various localities, says he is not prepared to combat the conclusions which Mr. Dunning has arrived at.*

A German naturalist of the name of Speyer, is somewhat Darwinian in his conclusions, after a long and closer investigation of our insect; and I cannot do better than quote a paragraph of Mr. Dunning's on the subject. He says:—"Speyer explains the peculiarities in mode of life and organization of Acentropus, by regarding it as the representative of an older branch of the original stock of moths, the other members of which branch have disappeared. The primitive insect forms must be sought in water, the atavi of the lepidoptera rose from the water to the land, and adapted themselves to terrestrial and aerial life; and Acentropus, the most distinctly aquatic of all known moths, is, from this point of view, the primeval type, the nearest extant representative of the grand ancestor of all the lepidoptera." I am not a believer in evolution myself, so scarcely accept this view. In almost every instance where the theory is tried to be proved, there is a "missing link" which cannot be found, even in a fossil state. Had Mr. Darwin been able to find the link between the fossil *Dryopithecus* and man, his theory could not have failed to be more complete. All I can say, if our largest moths, as the *Sphingidæ*, &c., (and these are small compared with their foreign relations) were developed from the insect which is the subject of this article, the evolution must have begun a long time ago. There is no striking resemblance between an *A. niveus* and *Acherontia Atropos*, except in that I have endeavoured to prove—that both belong to the same great order.

ARRIVAL OF SPRING MIGRANTS ABOUT BARNSLEY AND SOUTH YORKSHIRE DISTRICT.

BY T. LISTER, BARNSLEY.

ALL, except the wheatear (which usually arrives in the first fortnight of April) and the swallow, were from one week to ten days later than their average time for the last nine years. The house martin, which is stated to be becoming more scarce about some towns, as well as the swift, are quite numerous about villages and farms. One farmer at Dodworth reports 28 martin's nests on his premises, which is many more than he has previously seen. At Cudworth, Hemsworth Dam, Ackworth, and Empsall, all the members of the family have abounded. The finer weather after the middle of the month brought the other migrants, pretty near to their average time, as seen by the two columns of dates inserted below. The goat-sucker and cuckoo, abounding more on moors and heaths, were early, and never before recorded in such numbers.

DATES OF OCCURRENCE.

	First notice, 1875.	Average of 9 years.
Wheatear.....	March 31	March 29
Swallow (in Calder Vale) ...	April 7	April 10
Do. (in Barnsley district)	April 15	April 10
Cuckoo	April 12	April 14
Willow wren	April 15	April 10
Chiff chaff	April 15	April 2
Ray's wagtail	April 17	April 13
Sand martin	April 17	April 9
Goat-sucker.....	April 18	May 13
House martin	April 18	April 13
Tree Pipit	April 20	April 15
Redstart	April 21	April 14
Sedge warbler.....	April 21	April 24
Black cap	April 22	April 22
Whinchat	April 23	April 20
Whitethroat	April 25	April 25
Grasshopper warbler	April 25	April 30
Ring ouzel	April 25	
Land rail	May 2	April 27
Lesser whitethroat	May 3	May 4
Wood wren or warbler	May 5	April 30
Garden warbler	May 6	May 9
Swift	May 8	May 8
Spotted flycatcher	May 9	May 14
Nightingale	May 9	April 29

THE FLORA OF EAST SOMERSET.

By H. F. PARSONS, M.D.

[ABSTRACT.]

At the annual meeting of the Somerset Archaeological and Natural History Society, held at Frome on August 10th, 11th, and 12th, a paper was read by Dr. Parsons, late of Beckington, secretary to the Goole Scientific Society, on the Flora of the Eastern Border of Somerset. The flora of that neighbourhood was described as being in the main just such as a botanist would expect to find in an inland, slightly elevated, calcareous district in the south of England. Of the 1370 species enumerated in the body of the compendium to *Cybele Britannica*, 632 had been observed by Dr. Parsons in that neighbourhood; of these 632, 449 were of British or British-English type of distribution, and 121 of English type, 34 approached the Germanic, and 10 each the Atlantic and Scottish types, while eight were of local or doubtful type. The excess of Germanic over Atlantic species in a district so far to the west as to be included in the Peninsula province of Watson, was attributed partly to the greater richness in species of the coast of England, and partly to the circumstance that in the neighbourhood the palæozoic rocks of the West were to a great extent covered up by the oolitic and cretaceous strata of the south and east. The absence of *Rubia peregrina* and *Sedum Anglicum*,—two of the most abundant Atlantic species,—from habitats that might seem especially appropriate, was particularly noticed.

Of the great variety of strata in the district almost all are more or less calcareous, the chief exceptions being the upper green-sand and the old red sandstone. The marked difference between the flora on the sandy and calcareous strata was pointed out—a difference so striking as to enable one to tell at a glance the nature of the soil. Among the characteristic plants of the limestone were mentioned *Hippocratea comosa*, *Astragalus Glycyphyllos*, *Genista tinctoria* (at one time much gathered here for dyeing), *Poterium Sanguisorba*, *Daucus Carota*, *Pastinaca sativa*, *Torilis infesta* and *nodosus*, *Senecio æruginosus*, *Erigeron acris*, *Picris Hieracioides*, *Calamintha officinalis*, *Gentiana Amarella*, *Chlora persfoliata*, and *Ophrys apifera*.

A very marked calcareous flora was to be found on the barren wet marls of the lower oolite (forest marble and fullers' earth); on these soils orchids were especially abundant, as many as twelve species

being sometimes found in a single field. On the other hand, certain species were rarely or never seen on limestone or marl, e.g.—*Lastraea*, *Oreopteris*, *Blechnum boreale*, *Papaver Argemone*, *Spergula arvensis*, *Lycopsis arvensis*, *Salix repens*, *Rumex acetosella*; the heath tribe, the whortleberry and foxglove, and the *Sphagna*. The absence of the following plants, generally common on siliceous soils, was noted, viz.—*Senecio sylvaticus*, *Scleranthus annuus*, *Spergularia rubra*, *Jasione montana*, *Plantago Coronopus*, and *Anihemis nobilis*. Owing to the paucity of peaty soils, bog plants were scarce, *Pinguicula*, *Parnassia*, *Andromeda*, *Genista anglica*, *Hypericum elodes*, *Rhynchospora alba*, and *Potentilla Comarum* being absent, and *Drosera*, *Eriophorum*, *Erica tetralix*, and *Narthecium ossifragum* confined to one or two boggy spots on Mendip, where the old red sandstone comes to the surface.

Maritime plants were represented only by two or three cryptogams of not exclusively marine habits, as *Trichostomum crispulum*, *Cladophora glomerata*, and *Enteromorpha intestinalis*, and by a few species probably introduced by human agency, as *Armeria maritima*, *Smyrnium Olusatrum*, *Apium graveolens*, *Fæniculum vulgare*, and *Eruca moschatum*.

Alpine plants were absent, as the highest hills of the district barely attained 1000 feet. The characteristic plant of the first, or infer-agrarian zone of Watson—*Clematis vitalba*—was found to cease at a height of 600 to 700 feet, so that the more elevated hills seemed to attain to the second, or mid-agrarian zone. A few sub-alpine species, chiefly cryptogamic, were found in some of the hilly woods, viz.: *Vicia sylvatica*, *Polypodium Phegopteris*, *Tetraphis pellucida*, *Hypnum brevirostre* and *loreum*, *Sticta fuliginosa* and *pulmonaria*, and *Peltigera horizontalis*; but the more characteristic mountain mosses and lichens *Andrea*, *Hedwigia*, *Racomitrium*, *Sphaerophoron*, *Cetraria*, *Stereocaulon* and *Cornicularia*, were altogether absent. For a lowland district, however, mosses and lichens were very abundant, and among the wooded hills and rocky bottoms of East Somerset attained a luxuriance rarely exceeded, fruiting freely, and adding a great charm to the scenery. Fungi were also abundant in similar situations. Club mosses were absent. Ferns were abundant, the stone walls of the district being usually covered with the smaller species, especially *Ceterach officinarum*. Unfortunately the rarer kinds were in danger of extermination by unscrupulous collectors. *Polypodium Phegopteris* was believed to be for the first time recorded for the county. Of the phænogamic flora the most striking peculiarity was the local abundance of *Ornithogalum pyrenaicum*, the young flowering scapes of

which were occasionally eaten as a vegetable, under the name "wild asparagus." Other noteworthy species were *Aconitum Napellus*, *Helleborus foetidus*, *Draba muralis*, *Erodium moschatum*, *Impatiens Noli me tangere*, *Lathyrus Aphaca* and *Nissolia*, *Sedum album* and *dasyphyllum*, *Trinia vulgaris*, *Polemonium caeruleum*, *Verbascum Lychnitis*, *Herminium Monorchis* and *Fritillaria Meleagris*; but several of these had not improbably been introduced by human means. Of the 632 species 540 were probably natives, 43 denizens, 30 colonists; the remainder, with a number of other species not admitted into the list of British plants, being aliens and casuals.

Short Notes and Queries.

MR. GEO. WEBSTER will see, by this number of the *Naturalist*, that the bramble named is *Rubus lacinatus*.

SPHINX CONVOLVULI AT ARMITAGE BRIDGE.—A specimen of *Sphinx Convolvuli* has just been taken here.—G. C. B. MADDEN.

*Armitage Bridge Vicarage,
Huddersfield, Sept. 21st, 1875.*

ON the 23rd Sept. last I took a worn male specimen of *Euperia fulvago* on a piece of wood lying on the grass in a plantation near the Panorama View, Barmouth, North Wales. I believe it is new to the district.—S. BAIRSTOW.

Huddersfield, Oct. 3rd, 1875.

NAIAS FLEXILIS.—I have just heard that a very rare plant, *Naias flexilis*, has been found in Clunie Loch, near Blairgowrie, by Mr. Sturrock, schoolmaster, and another gentleman, and exhibited for them by Professor Balfour, at the meeting of the British Association, at Bristol. A local paper states that

this is the only locality where it has been found in Britain; but I find in Jeffrey's "British Conchology," vol. 1, p. 50, it is there mentioned as having been found in the Hebrides and the West of Ireland.—JOHN CONACHER, Jun.

Huddersfield, October 19th.

VERONICA TRIPHYLLOS AND SCHEUCHZERIA PALUSTRIS.—Has any botanist found *V. triphylllos* lately at any of the recorded stations? I found it plentifully five or six years ago, at the York one, but since then have not seen it. Is it at all susceptible to cold, wet springs? I should also be glad to hear if the *Scheuchzeria* occurs and flowers at the stations in West Riding flora. It occurs plentifully at Leckby Carr, but so far as I have seen has produced no flowers for a number of years. The same is the case with *Lysimachia thrysiflora*, which grows with it. The trees planted to drain the Carr are now getting up, and the partial shade may prevent the plants going through a ripening process necessary to flower.—G. WEBSTER, York.

WHILST fishing for trout in the Dysynni river, near Towyn, North Wales, on the 21st Sept. last, I encountered what Mr. Hobkirk would describe as "an apparent anomaly in natural history." I was wandering about the path bordering the river, with rod in hand, chatting to the fisherman, when we observed two very large fungi in a very conspicuous position on the ground. Upon the top of one was situated a large chrysalis, which Mr. Geo. T. Porritt, F.L.S. (at the meeting of the Huddersfield Naturalists' Society) named *Chærocampa Elpenor*. The pupa was in a most lively condition, and apparently did not realise the insecurity of its peculiar position. The fungus must (from the wet, foggy condition of the day) either have speedily sprung up, and by degrees pushed the pupa from its earthy dormitory to the top, or the larva must have crawled up the stem to the summit, and there undergone its metamorphosis. What appears singular is the fact that wind and rain were very turbulent, but neither succeeded in severing it from its exalted situation. No silken thread or binding whatever was apparent. The pupa is still in my possession.—S. BAIRSTOW.

Huddersfield, Oct. 3rd, 1875.

YORKSHIRE PLANTS.—Has it been decided what is the *Rubus* exhibited by Mr. Mosley at the Huddersfield meeting on Aug. 30, and commented upon by Mr. Bart-

lam on Sept. 11th? [See pp. 43-44.] Its hybridity was suggested, I see, by Mr. Hobkirk, and Mr. Bartlam is reported as having said it might possibly be a hybrid "between a bramble and *Sambucus nigra*, var. *dissectum*." The last suggested hybridity is simply impossible, and against all natural laws; but the fact stated by Mr. Bartlam that the cut-leaved variety of elder "was growing close beside the bramble in question," suggests another and much simpler solution of what seems to have been accounted somewhat of a vegetable mystery. The cut-leaved elder is an introduced plant, a favourite with shrubbery planters, &c., and probably the true agency that accounts for its presence in the locality explains the occurrence of the bramble. I enclose a bramble leaf: is it at all like Mr. Mosley's?* if so, his plant is the *Rubus laciniatus*, Willd., also an introduced species, which, coming from the northern east, fruits well in our gardens, and is not unfrequently placed in ornamental grounds, the leaf being peculiarly bizarre, and the lilac-pink cloven petals very pretty. A few years back, there were two or three plants of this cut-leaved bramble on a rough hedge bank near the Benrhydding Sanitarium at Ilkley, appearing semi-naturalised, but of course planted. I brought one root home, and it has thriven and still thrives amazingly amongst raspberry canes in my father's garden, near Leeds.

* The plant enclosed is the exact counterpart of Mr. Mosley's, and Dr. Lees' suggestion as to its origin may be the true one, as there is a garden near the hedge, but it contains no plant of this *Rubus* at present.—*Eds. Nat.*

Whilst gossiping on matters botanical, allow me to ask for fuller information where was gathered (and when) the *Wahlenbergia hederacea*, the ivy-leaved bell-flower, reported on pp. 47-48 of last issue, as "collected during the day," and named by two gentlemen at the Consolidated Naturalists' Meeting? It used to occur near Ripponden, and also near Gargrave-by-Skipton, and if from either of the old localities, or from a newly-discovered one, it will be equally interesting to have particulars corroborative of the non-extinction of this rare Atlantic-type plant in West Yorkshire. Our stations have been thought extinct, and they are but the outposts at best of the plant's range in England—a range in the case of these plants of Atlantic, or western type, which is gradually becoming more restricted.—F. ARNOLD LEES.

[The plant referred to was gathered on the same day on which it was exhibited, by Rev. W. Fowler and Mr. R. Jessop, in the Wessenden valley, a rather high moorland about eight miles west of Huddersfield, where it has been known for the last seven or eight years. It has also been gathered near Cook's Study, and at Dunford Bridge—both high moorlands (about 1500 feet) on the Yorkshire side of the range which divides that county from Cheshire and Derbyshire.—Eds. Nat.]

ORCHIDACEÆ.—As I can give perfectly reliable information to Mr. J. Anderson, Jun., Alresford,

Hants, as to *Orchidaceæ* in this neighbourhood, I have much pleasure in doing so, more especially as I know Alresford well, having lived ten years at Winchester (seven miles off), four years of which I spent at the college, and where I began my natural history tastes. This place is on the magnesian limestone (Permian series) a strip of which runs down the middle of Yorkshire into Nottinghamshire. I have this year gathered with my own hand the following species of the order *Orchidaceæ*. In names I follow Bentham's Handbook:—*Epipactis latifolia*, *Listera ovata*, *O. Morio*, *O. ustulata*, *O. mascula*, *O. maculata*, *O. pyramidalis*, *Habenaria bifolia*, and *viridis*—all the above abundant; *Ophrys apifera* and *muscifera*—but not, at least now, as has been given in a most reliable Yorkshire list of this locality. I have also the extreme pleasure of being able to state that *Cypripedium Calceolus* (lady's slipper) still exists in Wharfedale. I will willingly give Mr. Anderson my authority, which will I am sure satisfy him, but I do not give the exact spot, as I would not push my enquiry so far, seeing that my informant very properly wished it to be kept a secret.—J. S. WESLEY.

Wetherby, Oct. 4th, 1875.

RARE BIRDS AT BRIDLINGTON.—Pair of waxwings (*Motacilla Yarrellii*) shot by R. Morris, Aug. 10th, 1865.—Great squa gull (*Lestris cataractes*) shot by R. Morris, Dec. 17th, 1867. On the 21st, one old bird of the Richardson's squa (*L. parasiticus*), shot by the same per-

son.—Black-throated diver (*Colymbus arcticus*), found on the south beach, Bridlington Quay, in nearly full summer plumage, by G. Bayes, 1870.—Glaucous gull (*Larus glaucus*), old bird, winter plumage, by J. Watson, Dec. 21st, 1871.—Long-tailed duck (*Fuligula glacialis*), shot by S. Fox, Esq., in a pond at a place called Besengby, Dec. 23rd, 1872.—Greenshank, shot by G. Walkington, Aug. 26th, 1873.—Hobby (*Falco subbuteo*), shot by G. Banks, gamekeeper, Grindale, June 18th, 1874.—T. MACHEN.

Reports of Societies.

BIRMINGHAM NATURAL HISTORY AND MICROSCOPICAL SOCIETY.—BOTANICAL SECTION.—Tuesday, Sept. 11th.—Mr. Bagnall exhibited an abnormal flowering branch of a cultivated *Clematis*, from Mr. A. W. Wills. It consisted of a perfect flower at the end of the axis, with light blue sepals, and about one inch lower down the peduncle was a single sepal, the same colour as those on the perfect flower. A discussion ensued. Mr. Bagnall said that he thought it was an instance of arrestment of development—an abortive attempt on the part of nature to form another flower, but owing to the absence of nutrition, or some other cause, only one solitary sepal was produced.—Dr. Hinds agreed to that opinion. Mr. Morley said he thought it was a case of excessive development, that the solitary sepal did belong to the flower above, but by some cause or other the internode be-

tween the sepal and the flower became very much elongated, in the same way as the clover sometimes produced two or three whorls of flowers, then the peduncle (rachis) elongates quite an inch before it completes the inflorescence.—Mr. Bagnall then exhibited the following plants for the Rev. A. Bloxam, M. A.:—*Rosa pulverulenta*, new to Warwickshire; also *Rosa arvatica* and *R. decipiens* (rare in this county), and *Malva borealis*, from Hastings—a plant supposed by Mr. Babington to have been lost from this country.—From Dr. Braithwaite, a number of rare mosses from Scotland, Ireland, and Switzerland; and from Mr. H. Boswell, of Oxford, a number of rare mosses collected recently in Ross-shire.—Mr. Bagnall then exhibited the following plants, collected by himself:—*Utricularia minor* and *Spagnum auriculatum*, from Sutton Park—both new to Warwickshire; *S. papillosum* and *S. cymbifolium* (in fruit) rare in that condition in our county; *Rubus foliosus*, from Ansley coal-field, a very rare bramble; *Rosa Reuteri*, rare in the Midlands; *Stachys arvensis*, from Hartshill, rare in Warwickshire; and other rare plants.—J. MORLEY, Jun., Hon. Sec. of B. Section.

CRYPTOGAMIC SOCIETY OF SCOTLAND.—FIRST ANNUAL CONFERENCE AT PERTH, 29th September to 1st October.—The first day was devoted to excursions in the surrounding districts for the purpose of collecting specimens. One party, under the leadership of Sir Thomas Moncreiffe, Bart., and including

Mr. Worthington G. Smith, Rev. G. Stevenson, M.A., of Glamis, Mr. C. P. Hobkirk, Mr. Carrington and others, made a most interesting foray in the woods around Moncreiffe House, and Moncreiffe Hill ; another party, under the leadership of Col. Drummond Hay, and including Dr. M. C. Cooke, F.L.S., and Rev. J. Vize, explored the woods around Scone with almost equal success ; and others went in various directions in the neighbourhood. On the following day the members were engaged arranging in the City Hall, Perth, the specimens of fungi, &c., collected on the previous day, for their first annual exhibition. In the afternoon the annual business meeting was held—Sir Thomas Moncreiffe, Bart. (president) in the chair. It was resolved that the next show be held at Kelso in September, 1876. The Duke of Roxburghe was elected president. A large number of new members were proposed and elected, amongst the names added to the roll being the Right Hon. W. E. Baxter, M.P. for the Montrose Burghs. Papers were read as follows :—By M. C. Cooke, LL.D., editor of “*Grevillea*,” London, on “Certain Scottish Fungi ;” Mr. C. P. Hobkirk, editor of the *Naturalist*, Huddersfield, on “*Zygodon rupestris* ;” Rev. J. Stevenson, M.A., Glamis, on “The Fungi of Scotland north of the Tay ;” and by Mr. Stephen Wilson, on “Ergots.”—At seven o’clock the members held their annual dinner, at the Salutation Hotel (Mr. Carmichael’s). There were about seventy gentlemen present.

Sir Thos. Moncreiffe, President, occupied the chair ; and the croupiers were Dr. Buchanan White, Perth (Secretary), and the Rev. J. Stevenson, Glamis. Amongst others present were—Col. Drummond Hay, of Seggieden ; Dr. M. C. Cooke, London ; Rev. J. Keith, M.A., Forres ; W. G. Smith, London ; Rev. J. E. Vize, Forden, North Wales ; C. P. Hobkirk, Huddersfield ; Sheriff-Substitute Barclay ; and a number of local gentlemen. After an excellent dinner, which included various kinds of edible fungi, and which was done ample justice to, the usual loyal and patriotic toasts were given by the chairman and duly honoured. The toast of the evening, “Prosperity to the Cryptogamic Society of Scotland,” was proposed by Dr. Cooke, after which various other local toasts were given and replied to.—The “Fungus Show” in the City Hall, on the Friday, was a great success—indeed many eminent fungologists present pronounced it to be the largest of the kind ever known, it being estimated that on the tables and walls there were about 150,000 specimens. A centre table contained a large collection of the rarer and more frequently met with fungi, all named ; another table in front of the platform was divided into edible fungi and poisonous ones, also all named ; whilst the remainder of the tables were crowded with specimens gathered on the Wednesday, and others sent from other parts of the county, among the contributors being the Countess of Kinnoull, Lady Kinnaird, Duke of

Athole, Councillor Ogilvie, and Jas. Scrymgeour, of the Dundee Naturalists' Society, and many others. Mr. Chas. Howie, of Largo, exhibited a fine collection (some 2,000 specimens) of dried mosses, which were hung round the walls ; and Dr. Croall, of Stirling, another beautiful series of British Mosses and Hepaticæ ; Mr. English, of Epping, a small collection of preserved dried fungi, suitable for museums, which retained almost the appearance of nature ; and a lady of the Duke of Argyle's household, a splendid series of coloured drawings of fungi from nature. Two large trophies of fungi—one on the platform and one at the opposite side under the orchestra—arranged by Mr. J. Young and Mr. Carrington, added greatly to the appearance of the exhibition, which was further enhanced by a large collection of growing ferns, chiefly from the greenhouses of Sir Thos. Moncreiffe, Bart. It would be next to impossible to note the whole of the species exhibited, but the following list, kindly supplied by Dr. F. Buchanan White, F.L.S., indicates a few of the most notable :—From Rannoch—*Boletus flavidus*, n. B. ;* *Hydnnum lævигatum*, n. B. ; *H. imbricatum*, *Rhizopogon lutescens*, n. B. ; *Vibrissa margarita* White, *Trametes pini*, *Clavaria rufa*, *Peziza hippocobra*, n. s. ; *Boletus cyanescens*, *Labrella ptarmicæ*, n. B. ; *Phoma Stevensoni*, n. s. ; *Arcyria Friesii*, n. s. ; and *Agaricus Caput-Medusæ*, n. B. From Moncreiffe—*Bulgarea purpurea*, n. B., and *Agaricus aureus*, n. B. From Meih-leom—*Xylaria Scotica*. n. s.

GOOLE SCIENTIFIC SOCIETY.—The first winter meeting of this Society was held on Wednesday, Oct. 13th. Mr. Hunter read an instructive paper on “The History and Construction of the Microscope” ; and at its conclusion proceeded to point out the diverse modes of construction exemplified by the microscopes in the room, and to illustrate the different optical effects produced by direct, oblique, reflected, and polarized light, concluding by an exhibition of the microspectroscope.—H. FRANKLIN PARSONS, M.D., Hon. Secretary.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting, Sept. 27th, the President, Mr. G. T. Porritt, F.L.S., in the chair.—Mr. Samuel Bairstow exhibited a beautiful series of botanical specimens, chiefly ferns, from Barmouth. Various conchological specimens were shown by other members. In lepidoptera, Mr. Porritt exhibited a specimen of *Dianthæcia albimacula*, bred in June last by Mr. Joseph Sidebotham, of Manchester, from larvæ found by Mr. H. Moncreiff at Portsmouth, *Phycis Davisellus*, also bred by Mr. Sidebotham ; *Noctua ditrapezium* and *Cabera rotundaria* from Brighton ; *Acidalia contiguaria*, taken in Wales in July last, by Mr. S. J. Capper, of Liverpool ; and *Lobophora viretata*.—The Rev. G. C. B. Madden recorded the capture of a *Sphinx Convolvuli* at Armitage Bridge. Mr. S. L. Mosley shewed preserved larvæ of a number of species, including *Acidalia rusticata*, *Abraxas ulmata*, *Eu-*

* N. S. signifies New Species, and N. B. New to Britain.

pithæcia minutata, *Melanippe fluctuata*, &c.; Mr. S. Bairstow various species which he had taken at Barmouth the previous week, amongst them a pupa of *Chærocampa Elpenor* he had found exposed in an open place, laid on the top of a large fungus. Some discussion ensued as to how it had come there, the general opinion being that the fungus, in growing, had forced it from beneath the surface of the earth. He had also taken a specimen of *Euperia fulvago* there, thus adding another locality for this species.—Mr. Peter Armitage laid on the table a specimen of the wheatear (*Saxicola Enanthe*) he had just shot; it was considered late for this bird to be in the neighbourhood. After some further business, Mr. J. E. Palmer read an interesting paper on “The Ornithology of the District,” in which he detailed a number of birds which are found in the district during the whole year, including 39 species. Some years ago the kingfisher was a constant resident, but is now only occasionally seen in the winter. Mr. Morris, in his “History of British Birds,” says that “the golden plover breeds on Meltham moors,” but such is certainly not the case now, though small flocks of them are sometimes found passing over, generally after dusk.

Meeting, October 9th, the president in the chair.—Mr. Sidney Field exhibited an interesting piece of limestone containing several fossils. It had formed part of a gravestone in Almondbury Churchyard.—Mr. Copley exhibited

a specimen of *Nucula* from the Lias.—Messrs. Joseph Whitwam and Lister Peace exhibited a series of botanical specimens from the neighbourhood of Wentbridge, including *Bryonia dioica*, *Campanula glomerata*, &c.—The president shewed preserved larvæ of *Bombyx rubi*, *Lithosia aureola*, *Eupithecia minutata*, and *Knautiata*, (?) *E. virgaureata*, *Melanthis ocellata*, *Melanippe fluctuata*, and *Acronycta rumicis*. He said larvæ of *E. Knautiata* found on *Scabiosa Succisa* would also eat ling and ragwort, the food-plants of *minutata*. Mr. Porritt also exhibited a very large evidently exotic species of centipede, which had been brought to him from the railway (goods) station by a man who had caught it amongst dyewood, with which it had no doubt been introduced.—Mr. C. P. Hobkirk read a letter from Dr. F. Arnold Lees, F.L.S.—sent for publication in the *Naturalist*—suggesting that the *Rubus* exhibited by Mr. Mosley a few weeks ago was probably *R. lacinatus*, an introduced species that had got into the hedgerow where Mr. Mosley found it. Mr. Pontey had expressed the same belief at the last meeting, and no doubt this is the correct solution. Mr. Lees had sent a specimen which seemed in every way identical with Mr. Mosley’s. Mr. Hobkirk also gave a most interesting account of the Fungus Show just held at Perth, at which he had been present, and suggested that at some future time one should be held in Huddersfield.—Mr. Samuel Bairstow then read a most interesting and instructive

paper on "The Life History of *Dicranura vinula*, in which he gave a most exhaustive account of all the stages and peculiarities in the life of this singular insect; his remarks being listened to with the greatest attention by every member present. At its close a discussion ensued, joined in by Messrs. James Varley, William Talbot, of Wakefield (who was present as a visitor), Joseph Tindall, and the chairman.
—GEORGE BROOK, Hon. Sec.

THE LEEDS NATURALISTS' FIELD CLUB AND SCIENTIFIC ASSOCIATION.—190th Meeting, Sept. 29th, 1875, Mr. James Abbott, vice-president, in the chair.—Mr. William Todd, V.P., read a paper on "Applied Science as shown in the Manufacturers' Department of the Yorkshire Exhibition of Arts and Manufactures." The discussion was kept up by the chairman, Mr. W. H. Taylor, and the lecturer.

191st Meeting, Oct. 13th, Mr. Henry Pocklington, F.R.M.S., president, in the chair.—A letter conveying a vote of thanks for assistance rendered in connection with the conversazione at the Yorkshire Exhibition, was read. Mr. William Nelson exhibited the three British species of *Succinea*, several of their varieties, and a distorted example of *S. putris*. The rarest of the three species was *S. oblonga*, from Ballincollig, county Cork, where it was found by Mr. C. P. Gloyne. This species is apparently rarer than it was during the Tertiary period.—Mr. John W. Taylor exhibited *Helix aspersa*, var. *exalbida*, from Bristol, with the type for

comparison. The variety is rather uncommon. The species is very sensitive to cold, and hibernates early, clustering together in the crevices of old walls, &c., attached to each other by their epiphragms. The fluid that exudes from its body was formerly used to bleach wax for artistic purposes, as well as to make a firm cement when mixed with white of egg. They are supposed to have the power of excavating holes in limestone rocks to form their winter quarters. Mr. Taylor also showed a living example of *Limax maximus*, the largest of the British slugs, a very common species, from his own garden at New Leeds. These slugs often climb trees, and can lower themselves therefrom by a thread of mucus, which is of a thick and glutinous nature. It is liable to be infested by white parasitic mites, which swarm on its body, running in and out of the respiratory cavity freely. Slugs in general feed on decaying animal and vegetable substances, and are sometimes useful in eating the fungus which is the origin of "dry rot."—Microscopic slides, showing the structure of wool, cotton, raw silk, linen, mungo, and other textile materials, were exhibited in illustration of Mr. Todd's paper at the previous meeting.—Mr. John Grassham, who assumed the chair on the president's departure, called attention to the fact of starlings having this present season bred in the balance balls of the water tanks at Thirsk Junction. A number of other objects,—moths and other insects, and fungi, were shown by other members.

MANCHESTER SCIENTIFIC STUDENTS' ASSOCIATION.—About thirty members of this Society visited Urmston on Saturday, 10th Sept., under the leadership of Mr. Thos. Armstrong, F.R.M.S. A goodly number of plants was gathered during the afternoon, but none of any great rarity. After tea, at the house of the leader, a meeting was held, Mr. Leo H. Grindon in the chair, when a paper was read by Mr. Henry Hyde, on “The Lower Forms of Life, in which he described the most characteristic features, mode of nourishment and reproduction of *Amœba*, the *Foraminifera*, *Polycystinæ*, *Monas crepusculum*, *Melicerta*, *Vorticella*, *Volvox*, *Hydra*, &c., and particularly pointed out the important part played by some of these minute organisms in past geological ages, large mountain masses in many countries being composed almost entirely of their shells. The paper was well illustrated by diagrams and living specimens.

to William Buckley, Knowl, and second prize to H. H. Oldroyd, Hopton. The secretary was then called upon to read his report, from which it appeared that the Society, though young, was in a very flourishing condition, and promised well for the future. Upwards of 200 different species of plants had been produced at the meetings, some being very rare ; and some of the members had commenced the study of geology and entomology.—The chairman delivered a very appropriate address, commenting favourably on the position and prospects of the Society.—Mr. John Armitage, a veteran botanist from Almondbury, near Huddersfield, spoke for a considerable time on the advantages to be derived from studying natural history. Bouquets of wild and cultivated flowers adorned the table, and a few choice collections in lepidoptera and geology, lent by some of the members, added greatly to the interest of the meeting.—EDWIN STOKS, Sec.

MIRFIELD NATURALISTS' SOCIETY.—Meeting, 2nd October—Rev. B. Wilson, president, in the chair. Twenty-four wild plants (22 of them in bloom) were produced and named by Mr. John Newsome and Mr. Joshua Buckley ; and geological specimens were also produced and examined.—On Saturday, the 9th October, the members and friends of the Society held a social meeting in the Working Men's Club-room, the president, Rev. B. Wilson, in the chair, who presented two prizes for bouquets of wild flowers gathered during the summer—first prize

OVENDEN NATURALISTS' SOCIETY.—The monthly meeting of this Society was held on Saturday. Sep. 25th, in their Meeting-room, Illingworth, Mr. T. Robertshaw, the president, in the chair. A number of botanical specimens, collected by the president, were named by Mr. R. Earnshaw, including *Chrysanthemum segetum*, *Carduus Marianus*, *Scabiosa arvensis*. Mr. T. Hirst exhibited a number of birds, rare in this district, including one Knot (*Tringa vulgaris*), shot at Fly-flats reservoir, by Mr. W. Watson ; one greenshank (*Totanus glottis*) ; and one redshank (*T. calidris*), shot

at Chelker reservoir, near Draughton, by Mr. J. Garforth; three young Virginian owls; and also a pair of ground squirrels. Mr. J. Ogden exhibited and named a number of lepidoptera, also a fine specimen of *Vespa synagris*, caught alive at Denfield, Wheatley. A number of geological specimens were exhibited by Messrs. T. Cockcroft and M. Crowther: a sandstone cast from Ringby, showing the inner bark of stigmaria; a very fine cone of cone-in-cone, from Windy Bank pit, Northowram; and round, leaf-like form of reticulated woody tissue, from No. 3. shaft, Queensbury Tunnel, named by Mr. J. Spencer, of Halifax.

RASTRICK NATURALISTS' SOCIETY.—The monthly meeting of this Society was held on Monday evening, September 13th. Mr. William English, vice-president, took the chair, and in his opening remarks alluded in a very kind and touching manner to the death of Mr. Joseph Rushworth, the late secretary. He then called upon Mr. Wentworth to name the plants. Forty-eight specimens were exhibited, among them being many rare and beautiful specimens, brought from the Lake District and the coast towards Morecambe Bay, such as *Gentiana Pneumonanthe*, *Polygonum maritimum*, *Crithmum maritimum*, *Senecio sylvaticus*, *Thymus Serpyllum*, *Raphanus maritimus*, *Origanum vulgaris*, *Circæa lutetiana*, and many others. Several plants were placed upon the table, which had been collected in the churchyard at Grasmere, particu-

larly a sprig of yew (*Taxus baccata*), from the tree which overhangs the grave of the poet Wordsworth. A number of moths were exhibited and named by Mr. W. Kaye, notably a splendid death's-head moth (*Acherontia Atropos*), taken at Rastrick; *Polyommatus phœas*, and several others.

STAINLAND NATURALISTS' SOCIETY.

—This Society held its monthly meeting on Monday evening, Oct. 4th, Mr. J. Kippax in the chair. The following specimens were exhibited by the chairman: puffin, arctic tern, guillemot, razor-bill, kittiwake, goat-sucker, and sparrow-hawk, shot in Scotland; by J. E. Garred: lesser tern, caught at Blackley, *Acherontia Atropos*, *Sphinx Convolvuli*, and a collection of marine algæ. On the 25th of September, a large bird (said to be a heron) was seen flying about Elland Townfields by some boys, and was ultimately knocked down on the wing with a stone. I saw the last swallow on the 12th inst., and the first redwing on the 15th inst.—CAIUS CASSIUS HANSON.

WAKEFIELD NATURALISTS' SOCIETY.—The monthly meeting of this Society was held on Thursday, October 7th, J. Wainwright, Esq., F.L.S. (president) in the chair. Mr. H. Sims exhibited fine specimens of the following insects:

—*L. cæsiata*, *L. olivata*, *C. corylata*, *C. Ribesiaria*, *A. unanimis*, *X. gilvago*.—Mr. Fogg exhibited larvæ of *M. maura*, and Mr. Hall a fine specimen of *C. edusa*, taken in the gardens at Methley Hall.—WM. TALBOT.

Diary.—Meetings of Societies.

- Nov. 1. Barnsley, Stainland, Birkby, Bradford, Todmorden.
,, 2. Liversedge.
,, 3. Holmfirth. Leeds: Paper, "The Manufacture of Steel"—Mr. J. W. Westmoreland, A.R.S.M.
,, 4. Wakefield.
,, 6. Huddersfield Naturalists': Paper, "Curiosities of Physical Geography"—Mr. John Sanderson.
,, 7. Clayton West, Mirfield, Paddock.
,, 8. Bradford, Rastrick.
,, 10. Leeds: Exhibition of Specimens and Conversation.
,, 13. Heckmondwike, Ripponden, Honley, Middlestown.
,, 15. Birkby, Bradford.
,, 17. Leeds: Paper, "Tidal advances upon the coast of Kent"—Mr. John T. Beer, F.R.S. Lit.
,, 20. Paddock.
,, 22. Huddersfield Naturalists': Paper, "Entomological Work in 1875"—Mr. S. L. Mosley.
,, 24. Leeds: Special General Meeting for the consideration of the Laws of the Society,
,, 27. Ovenden (13th Annual Meeting), Honley.
,, 29. Bradford, Birkby.
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THE NATURALIST is published on the first of every month; Subscription, 4/- a year, post free, payable in advance.

N.B.—The Editors will be obliged if those gentlemen who have not already sent their Subscriptions, will be kind enough to do so; and any gentlemen desirous of subscribing should send their names without delay.

COMMUNICATIONS have been received from Messrs. J. S. Wesley, S. Bairstow, W. Talbot, Rev. W. Fowler, Bradford Naturalists' Society, and the Brighouse Naturalists' Society.

EXCHANGE.

DESIDERATA.—*Z. Exulans*, the northern variety of *Auroraria*, and many northern species. Duplicates.—*Quadra*, *Apiciaria*, *Obeliscata*, *Russula*, *Turca*, *Serena*, *T. Quercus*, *Adippe*, *Aglaia*, *Rhamni*, *Plumigera*, *Tipuliformis*, *Pimpinellata*, *Trisignata*, *Centaureata*, &c.—J. ANDERSON, Junr., Alresford, Hants.

DUPLICATES.—Pupæ of *P. Machaon*, Imagos of *A. Adippe*, *A. Selene*, *T. Quercus*, *L. Dispar*, *Egon*, *T. Rubi*, *P. Sylvanus*, and others. Desiderata.—*M. Athalia*, *M. Cinxia*, *G. C.-album*, *E. Blandina*, *T. Betulæ*, *C. Plantaginis*, *M. Bombyliformis*.—H. T. PRESTON, Riversfield, Catton, Norwich.

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No. V.

DECEMBER, 1875.

VOL. I.

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HUDDERSFIELD :

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TO CORRESPONDENTS.

The Editors will esteem it a favor, if the Secretaries of Field Clubs and Naturalists' Societies throughout the Kingdom will favor them with occasional Notes of their proceedings and Excursions, when of interest.

Papers read at Meetings of these Societies, or otherwise, on any branch of Natural History, will be gladly received and inserted in full, if of sufficient general interest, or in abstract, if of only local interest.

All communications, except Advertisements, Exchanges, or Short Queries, should, if possible, be in the hands of the Editors not later than the 18th of the current month, to insure insertion in our next issue, and should be written on one side of the sheet only.

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Original Articles.

THE BIRDS OF WAKEFIELD: *

With particulars of the occasional visits of Rare Species, and of those that have been observed to breed in the neighbourhood,

FROM 1845 TO THE PRESENT TIME.

BY WILLIAM TALBOT.

FALCONIDÆ.

HOBBY (*Falco subbuteo*)—

Shot at Bilham in February, 1845, by Mr. Charles Parkin, the Keeper, in whose hands I had the privilege of seeing it shortly afterwards. It was sent to Mr. Hugh Reid, Doncaster, to preserve.

MERLIN (*Falco æsalon*)—

I have seen eleven specimens that have been killed in the immediate neighbourhood. My friend Mr. Ball, late keeper of Hickleton, called it "the little blue pigeon hawk," and said it was the most daring and destructive of the hawk tribe. I have often seen during the winter (1872-3) the Merlin ranging the fields round Mount Pleasant. Its flight is very rapid.

KESTREL (*Falco tinnunculus*)—

Breeds at Newland plantation, Walton Park, Hawpark, Notton Plantation, King's Wood, and Longbank Wood (Newmiller-dam), and Bullcliffe Wood: in fact, it is of much more common occurrence in this district than is generally supposed. During the winter of 1872-3 I have frequently observed it perched on the top of a corn stack in a farm-yard near my house, evidently on the watch for mice.

SPARROW-HAWK (*Accipiter Nisus*)—

Of frequent occurrence, and breeds in several places in the neighbourhood.

BUZZARD, (*Buteo vulgaris*,)—

Mr. Chas. Parkin, in my presence, shot this bird at Bilham, in September 1846, and gave it to me. I sent it to Mr. Abraham Wright, Taxidermist, who informed me that it was a young male bird.

* Some portions of the earlier pages have already appeared in print, but we think it advisable to reproduce them in a complete form.—*Eds. Nat.*

HONEY BUZZARD (*Pernis apivorus*)—

Shot at Chevet, in September, 1858, by Mr. Mellor, gamekeeper, who forwarded it to me to be preserved. It is now in the possession of Sir L. M. S. Pilkington, Bart., of Chevet Park.

MARSH HARRIER (*Circus aeruginosus*)—

In April, 1869, a fine female was found by the gamekeeper, caught in a rabbit trap, in Cudworth wood. I saw the bird in the hands of my friend, Mr. G. Parkin, Taxidermist, of Wakefield, previous to his skinning it.

STRIGIDÆ.**LONGEARED OWL (*Otus vulgaris*)—**

Brockerdale and Brodsworth woods are its favourite breeding places. It has been killed at Bretton, Newmillerdam, Woolley, and Ardsley. Every winter Mr. Parkin has received several specimens to be preserved.

SHORTEARED OWL (*Otus brachyotus*)—

Specimens of this bird have been frequently killed in this district during the passage from and to their breeding quarters, between the months of October and March each year. Mr. Parkin informs me that during the winter of 1860, he had nine of these birds brought to him, all of which had been killed in the immediate neighbourhood. I have one in my collection which was killed in a field adjoining my house.

WHITE OWL (*Strix flammea*)—

Breeds at Newland, Heath, Crofton, Walton Hall, Woolley Park, and King's Wood, Newmillerdam. It is not at all uncommon in this locality, but, owing to its nocturnal habits, it is rarely seen, except by those interested in Ornithology. Some time ago I had an opportunity of witnessing, for four successive nights, one of these birds feed its young. The regularity of its first appearance was something wonderful, as it never came earlier than 8-45, and was never later than 8-48 on any of the four nights. After its first visit to its young, it continued, at intervals of from four to four and a half minutes each, to bring food to them. On the fifth night we ventured to look at the young ones, and found them changing from the beautiful downy state to pen-feathers. The stench was almost unendurable ; the

hissing sounds and cracking of the bills with which we were received, showed that we were anything but welcome visitors.

TAWNY OWL (*Syrnium stridula*)—

I have known this bird breed plentifully in Hickleton, Bilham, and Brodsworth Woods. Its nest is occasionally found at Walton Hall, Bretton and Woolley Parks, Newland, and at King's Wood.

LANIADÆ.

GREAT GREY SHRIKE (*Lanius excubitor*)—

One of two specimens, shot at Methley, was brought to the Wakefield Naturalists' Society's Meeting, on the 17th November, 1864, by Mr. G. Lumb, in whose collection it now is.

REDBACKED SHRIKE (*Lanius collaris*)—

A fine female bird was shot at Flanshaw, on the 26th September, 1866, by Mr. Smith, and sent to me to be preserved.

MUSCICAPIDÆ.

SPOTTED FLYCATCHER (*Muscicapa grisola*)—

Its nest, during the breeding season, may be found on any of the estates in the neighbourhood, and it occasionally builds in St. John's Church yard in this town. It does not seem to be at all particular as to the situation of its nest, as the following circumstance will show:—A short time ago, the wife of the gamekeeper living at Methley Lodge, having no further use for her pattens, the weather being dry and warm, hung them up on a nail, against the house wall, by the kitchen door; a few days afterwards she discovered, to her great surprise, that a flycatcher had built its nest inside one of the pattens, and not being disturbed, it reared a brood of young ones in this unsheltered and open place. The most casual observer can scarcely pass this bird without noticing the manner in which it takes its food, repeatedly darting into the air, catching an insect, and then invariably returning to the same twig or post.

My earliest date of this bird's arrival is the 25th of April, and for many years I have never noted its first appearance later than the 11th of May.

PIED FLYCATCHER (*Muscicapa atricapilla*)—

Was shot at Hickleton, in 1853, by my friend Mr. Ball, and is now in his collection.

MERULIDÆ.

DIPPER (*Cinclus aquaticus*)—

One was shot near the Suspension Bridge, at Thornes, in March, 1854; I saw it in the hands of Mr. Wright, previous to its being skinned.

MISSEL THRUSH (*Turdus viscivorus*)—

Breeds commonly in the orchards and woods around Wakefield. I have found its nest, containing eggs, as early as the first week in March. During a mild winter, its wild, harsh song may be heard from the beginning of January.

FIELDFARE (*Turdus pilaris*)—

Is exceedingly abundant in the winter months. During the winter 1872-3, I frequently saw near my house, a beautiful light buff variety of this bird. My earliest date of this bird's arrival is the 30th of September; and the latest of its departure the 29th of April.

SONG THRUSH (*Turdus musicus*)—

Breeds very plentifully in this district. I have seen its nest with eggs in as early as the 9th of March, and as late as the 27th of July.

REDWING (*Turdus iliacus*)—

Large flocks of this bird stay with us throughout the winter. The earliest date at which I have noted its arrival is the 2nd of October; and the latest of its departure the 27th of April.

Some years ago there was a great controversy as to whether this bird sung during its stay in England. Bearing on this point, I may mention that Mr. Parkin and I have conclusively settled the question in our own minds, as we have shot it whilst in the act of singing. It is surprising to see the large numbers of these birds congregating together, previous to leaving us for their breeding quarters in Norway.

BLACKBIRD (*Turdus merula*)—

Is very abundant in this neighbourhood, and may be found nesting in gardens in the town. Its song, to unpractised ears, is not unfrequently confounded with that of the missel thrush, but it may be easily recognised by its milder tone, and more flute-like notes. It is one of the very few birds which occasionally sing as they fly. Mr. Parkin has several beautiful pied varieties, shot in this locality.

(*To be continued.*)

DICRANURA VINULA:

OR,

THE PUSS MOTH.

(Paper read before the Huddersfield Naturalists' Society, 9th Oct., 1875.)

BY S. BAIRSTOW.

I AM sensible of the great disadvantages under which I labour in attempting to give a paper on a scientific subject, to a scientific audience; but, at the same time, considering that the following remarks have been collated in the commercial rooms of different hotels, and jotted down at intervals; and considering that I am but a student in the science of Nature, and of a very recent date, I must ask you kindly to bear with any little discrepancies of fact or description which I may happen to make, or of any observations that may appear inapplicable to the subject.

In selecting a title for my paper, I thought it preferable to give a simple and unvarnished account of the life of an insect which, in all its stages of existence, pourtrays peculiarities of an interesting character, rather than attempt to dabble with theories or expositions far above my reach. The Puss Moth was the first creature that ever made me aspire to a proficiency in the study of Nature, and I believe the first that ever particularly arrested my attention to the caterpillar brood, so to the praises of *D. Vinula*'s virtuous character I dedicate the juvenile effusions of a first essay on a Natural History subject.

Vinula belongs to the order of moths called *Cuspidatæ*—an order which usually in the larval condition procures or eats its food in the night-time. It is common throughout the United Kingdom, indeed of *Vinula* I have procured as many as 34 different larvæ in one afternoon from one poplar tree, at the back of my father's residence in Fitzwilliam-street. It derives its scientific name from the two-headed or two-pointed shape of the anal tubes situate at the extremity of the tail. The more common name of "Puss" (according to the Rev. J. G. Wood, in his "Common Objects of the Country") is derived from the soft furry coat of the imago, but this definition I consider somewhat vague. I should say the name is obtained from the appearance of the larva, when more particularly in a state of repose or rest (a state far from common with the puss larvæ), its body being in a position as to appear for all the world like an enraged cat. Picture

to yourselves a cat which, being destitute of cat-meat for a week, is suddenly presented with a rat; there we have, in the pounce of the cat, *D. vinula* exactly. With a back shaped like a chain of mountains, it presents no ordinary larva-like spectacle; and when at work feeding on a poplar leaf, its whole energies and appetite seem directed towards the entire demolition of that leaf. In other respects it is vastly dissimilar to a cat, as it is slow of movement, and rather inactive, anything like a puss' agility being conspicuously marked by its absence. The ova or eggs are laid indiscriminately (with regard to arrangement) on the leaves, trunks, or branches, of more commonly the poplar and willow trees; but I once discovered a small batch deposited on the stem of a holly-leaf, which I succeeded in rearing. I exhibit an imago bred from one of the ova. They are readily detected by their peculiar shape and colour, viz., round on the top, flat base, reddish-brown colour, and somewhat large. A particle of coloured melted borax dropped on to a smooth surface (as glass) would resemble them in appearance. They may be obtained the latter end of May, they are prolific in July and August, and extend until about the 25th of September. I may here mention that there are two separate and distinct colours to be noticed, in this animal, from the ova up to the imago condition, of which I shall speak presently. It is well-known that at each successive change of skin the caterpillar is observed to devour its recent habiliment. It neither believes in the principle of giving away old clothes nor of vending them. Everything is utilised, even to the old worn-out coat, which it wears threadbare, then casts, then eats; and it is always ready to do battle with a marauder, who, not finding sufficient "*diner*" off its own clothes, seeks by theft to obtain some one else's. Still, there are exceptions to all rules, and hence sometimes we find an entire skin hanging down from some prominent position like a clothes line on a washing day. There are comparatively few more pretty sights in nature than an elegant full-grown, well-developed puss larva. Many sights are larger, more gorgeous, but

“ Ask why God made the gem so small,
And why so huge the granite?
Because God meant mankind should set
The higher value on it.”

However, as it is worthy of being well described, I must either resort to our worthy president's abilities, or give it in the elaborate and precise language of Mr. Newman, as follows:—

“ The full-grown caterpillar rests with its flat head drawn into the second segment, and its anterior segments elevated. The body is

quite smooth, the dorsal outline rising to a pointed hump on the fourth segment, then falling to the sixth segment, then of uniform substance to the ninth, and thence the body is rapidly attenuated to the thirteenth, which terminates in two horns covered with scabrous points, each emitting, when the caterpillar is irritated, a slender, pink, drooping filament. The head is pale brown in front, and black at the sides. The recess into which the head is withdrawn is pink, with a large black spot on each side. The body has a white lateral stripe, ascending obliquely from each side of the head to the apex of the hump, then descending obliquely to below the spiracle on the eighth segment; then again ascending elliptically, and terminating at the base of the anal horns. Above this white stripe the body is whitish, longitudinally striated with purple brown, the white predominating along the median line, the purple brown predominating in the vicinity of the lateral white stripe. Below this white stripe the body is yellow green, with the exception of a nearly round purple brown blotch just above the clasper on the eighth segment. This blotch, not always present, is bordered above with white; the legs are yellow green, with a black ring at the base and black tips. The eight central claspers are green, the two horn-like anal tubes whitish, with black scabrosities."

The pink filament referred to in Mr. Newman's exhaustive description is, indeed, a most remarkable appendage, but as regards utility it is yet covered with a mystic cloud. Whether for attack or defence, whether for ornament or of curative properties, is yet to be ascertained. Some indeed say that out of this appendage there issues a kind of acidulated liquid, which can saturate a part affected by any insect or dangerous rival, and perfectly cure the wound; but this I have not yet personally observed, though I apprehend the statement is founded on fact. If a pin, however, or other sharp instrument be used in touching the larva, almost instantaneously do there protrude these long and slender weapons, and with a shrug the animal's whole body vibrates.

I have previously referred to two distinct varieties of colour that prevail in all the stages of the caterpillar's existence. One possesses through life a dark red brown colour, another a light pink and even yellowish tinge; and it has been and is a matter for discussion and speculation whether the tinge is distinctive of the sexes or variety. I believe it to be neither. After many trials, after having bred many species, and in many different manners, I have invariably concluded

that it was merely a freak of nature in the intestinal matter, and no distinction of sex or variety whatever. One dark brown ovum reveals a male imago, another dark ovum a female ; and so with the other colour—one may produce a male moth, another a female. Whether the difference of colour is attributable to weakness on the part of the male or female, collectively or singly, it is not for me to presume on an opinion : I should be glad to hear naturalists' "public opinion" on the matter. Young caterpillars are the most precocious and pugnacious, but with their increasing size and age I am glad to say their common sense, or common instinct, also develops. I have observed, in breeding this larva, that often a "puss," which seemed (a very short time ago) to have been in a healthy condition, sickens and dies, and that very speedily. I am led to imagine that some kind of an epidemic, or fever, inaugurated by that single one, has spread through the whole brood, and death has carried them away consequently. But some day I may be able to tackle the subject with more solid foundation for my surmises than at present I possess.

A caterpillar's life seems to be one continuous routine of changing skins, and no sooner is one discarded than another appears on the horizon, first as a dainty, delicate covering, then gradually becoming stronger and healthier at every turn. Casting off one skin and assuming another must by no means be confounded with the metamorphosis it undergoes during the last stage of existence, as, comparatively speaking, one is but a slight operation—a day's work ; the other is the work of a whole lifetime. I believe most animals of the creeping class at some period of their lives throw off or change their skins. Of course they, like *Vinula*, have their growth forcibly circumscribed during the period they remain in the original covering. Thus, for instance, "puss." It grows until a certain period, when every point of the envelopment is stretched to the uttermost pitch—then the skin, being unable to meet the exorbitant demands of its interior members, whose faculties (at most other times dormant) are always accessible to the cry, "Food!" must of necessity burst, a new encasement having been previously matured. The cast-off skins, withered and contemned, fold up similarly to the slides of a telescope—"wheels within wheels," in fact—though often a skin may be discovered almost perfect in exterior and form. Indeed, I have somewhere read that all the parts of the head, even to the skull and teeth may be observed with the aid of a microscope. A skin is cast off by successive contortions, wriggles, or *squirms* (if I may use a

vulgar, but very expressive word), and it appears a formidable undertaking at all times to a caterpillar.

One more remarkable characteristic of "Pussey's," and then I proceed to the pupal condition. It is a proven fact, acknowledged by all entomologists, that these larvæ devour each other's tails, and that with apparent gusto. I had one last season that actually nibbled off portions of no fewer than three respective lateral appendages, and then, "little wanting more," and "*entrée requiring desert*," finished p with a good round of poplar leaf.

(To be continued.)

Short Notes and Queries.

CURIOS EGG.—On calling last week on one of my churchwardens, who is a farmer, his wife showed me two shells of duck's eggs, one of which had come from the interior of the other. The larger—the shell of which, although not of the usual thickness, still retained its shape when empty—measured, externally, 11 inches by 8; the smaller, 7 inches by 6. Each of them contained a perfect yolk.—P. H. JENNINGS.

Longfield Rectory, Gravesend.

Leucobryum glaucum.—Many years ago I gathered a single tuft of this moss in Dungeon Wood, near here, but could not find another scrap of it anywhere at the time, nor has further frequent search resulted in any greater success. This was the only spot in our district where I had thus ever seen it, and there it could not again be found. I had the good fortune, however, when rambling across the moors in the Wessenden valley, on 21st inst., to come upon another tuft of it, perhaps in a rather unlikely looking habitat, but there was no doubt as to the plant. It

may now be safely added to the moss-flora of this district, and I think I have sufficiently marked the spot to be able to find it again readily.—CHAS. P. HOBKIRK.

Huddersfield, Nov., 1875.

Reports of Societies.

BARNESLEY NATURALISTS' SOCIETY.—The usual monthly meeting of this Society was held in their room, on Monday, the 1st Nov. The president, T. Lister, Esq., in the chair, who exhibited some geological specimens from the oolite and limestone district of Bristol, obtained during his visit to the British Association meeting. Mr. Cope exhibited the following specimens of lepidoptera, taken by him during a short stay in the Channel Isles, viz:—*G. rhamni*, *C. edusa*, *C. hyale*, *C. hera*, *L. argiolus*, *L. alsus*, *A. citraria*, and three specimens of *Larentia peribolata*, a common continental species. Mr. Harrison brought for distribution: *G. rhamni*, *T. fimbria*, *C. promissa*, *H. auroraria*, *G. obfuscata*, *S. sybilla*, *X. gilvago* (bred), *X. citrago* (bred), *O. gonostigma* (bred), *X. silago*, *T. quercus*, *V.*

Atalanta. A specimen of *S. Convolvuli* was reported to have been taken by the gardener to Mr. Wright, of Masbro', near Barnsley. — JNO. HARRISON, Hon. Sec.

BRADFORD NATURALISTS' SOCIETY. —The usual fortnightly meeting was held on Monday, Oct. 4th, the president, Mr. John Carter, in the chair. The usual routine business was transacted, after which Mr. J. W. Carter exhibited and named the following British butterflies: *Erebia blandina*, *Chortobius Davus*, *C. Pamphilus*, *Limenitis Sibylla*, *Vanessa cardui*, *V. Atalanta*, and *V. Io*. A few moths of the season were also exhibited by Messrs. E. Beaumont and H. Andrews, including *Hypernia defoliaria*, *Cheimatobia brumata*, *Scopelosoma satellitia*, *Miselia oxyacanthæ*, *Phlogophora meticulosa*, and *Calocampa exoleta*. Some remarks were also made by the members on the abundance of the larvæ of *Bombyx rubi* on Baildon Moor, near Bradford.

MEETING, OCTOBER 18TH. —The president in the chair. The minutes of last meeting were read and other routine business transacted, after which a beautiful collection of British ferns was exhibited by Mr. J. W. Brook, including *Asplenium marinum*, *A. adiantum-nigrum*, *A. lanceolatum*, *A. trichomanes*, *A. germanicum*, *A. viridis*, *Polypodium calcareum*, *P. vulgaris*, *Polystichum angulare*, *Woodsia ilvensis*, *Hymenophyllum unilaterale*, *Cystopteris fragilis*, &c. A few moths of the season were exhibited.—J. W. CARTER, Hon. Sec.

BRIGHOUSE AND RASTRICK BOTANICAL AND NATURALISTS' SOCIETY. —The regular monthly of this Society was held on Monday evening, Mr. William English in the chair. The botanical specimens, 55 in number, were named by Mr. G. B. Wentworth, the rarer plants being *Althea officinalis*, *Aegopodium podagraria*, *Pulicaria dysenterica*, &c. Three conchological specimens were exhibited and named by M. George Lister: *Zonites excavatus* (a rather scarce shell in this district), *Helix fulva*, and *Helix rotundata*, var. *pyramidalis*. Several specimens of lepidoptera were shown, and named by Mr. John Hirst—*Chelonia caja*, *Vanessa Atalanta*, and several moths.

GOOLE SCIENTIFIC SOCIETY. —Wednesday, Nov. 10th, Mr. M. A. Morris, president, in the chair. The following specimens were exhibited:—The lamprey, taken in the Ouse, and much prized as bait for cod, by Mr. Savage; the Colorado beetle, by Mr. Hunter; collections were exhibited of dried exotic ferns, by Mr. Bunker and Mr. Gardiner; of recent fungi, by Mr. Herbert Parsons; and of dried British plants, by Dr. Parsons. A paper was read by Dr. Parsons, on “The maritime plants and tidal rivers of the West Riding.” The author had noticed the following maritime plants growing undoubtedly native in the West Riding, viz:—*Spergularia media*, *Apium graveolens*, *Aster Tripolium*, and its var., *discoideus*, *Glaux maritima*, *Samolus Valerandi*, *Plantago maritima*, *P. coronopus*, *Rumex mariti-*

mus, Zannichellia pedicellata, Juncus Gerardi, Scirpus maritimus, Sclerochloa maritima, and S. distans. Among casually occurring plants, were mentioned *Carduus tenuiflorus*, *Atriplex littoralis*, and others on ballast; marine algæ, such as *Plocamium coccineum*, (a specimen of which was exhibited), washed up from the sea; and diatoms from Peruvian guano in the river, into which they had found their way with the drainage of cultivated fields.—H. FRANKLIN PARSONS, M.D., Secretary.

[We purpose publishing this paper *in extenso* shortly.—EDS. NAT.]

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting, October 6th, the president, Mr. G. T. Porritt, F.L.S., in the chair. Mr. T. H. Bartlam named a series plants from Crosland Moor, exhibited by Mr. John Shaw, including *Erica cinerea*, *Empetrum nigrum*, *Erodium moschatum*, *Trifolium pratense* (curious variety), *Xanthium spinosum*, &c., the last three from shoddy refuse. Mr. James Varley recorded having seen martins on the wing the last day of October, at Hebden Bridge; the last date they were observed at Huddersfield was October 26th. Mr. Joseph French read an interesting extract from an Australian paper on some kangaroo bones which had been recently found, on which a short conversation ensued.—Mr. Ed. Brooke, F.G.S., presented to the Society a copy of "Lindley and Hutton's Fossil Flora," for which a unanimous vote of thanks was passed.—Mr. John Sanderson, of Holmfirth, then read

a paper on "Curiosities of Physical Geography," after which an animated discussion took place, joined in by Messrs. Richard Jessop, George Brook, Joseph Tindall, C. P. Hobkirk, Joseph French, Edward Taylor, A. Spiegel, and the chairman.

MEETING, OCTOBER 25TH—the president, Mr. G. T. Porritt, F.L.S., in the chair. Mr. Joseph Tindall exhibited a specimen of the common toad, which had been brought to him by a man who said he had found it alive embedded in a solid block of coal, which, of course, neither Mr. Tindall nor any other member believed. The president exhibited a specimen of *Cucullia gnaphalii*, bred during the season from a larva found last autumn in West Sussex; also a specimen of *Lemiodes pulveralis*, taken in July last at Folkstone. Mr. S. L. Mosley showed a living example of *Dasypolia templi* he had taken on a lamp on his way to the meeting; also a series of *Acidalia rusticata* (second brood), bred from eggs sent him by Mr. Porritt, when on a collecting expedition in Kent. Mr. Mosley also exhibited an interesting series of grasses from the neighbourhood of Blackpool. Mr. J. R. Dore exhibited a large and interesting series of specimens, entomological and botanical, by means of the oxy-hydrogen light, which were greatly admired.—GEORGE BROOK, Hon. Sec.

HUDDERSFIELD BOTANICAL SOCIETY.—This Society held their monthly meeting Oct. 17th, when there was a large number of

specimens exhibited, collected by Messrs. Robinson, Sykes and Shaw, being one of the best collections which has been seen for some time in the month of October. Amongst them may be mentioned *Aspidium cristatum* (Slaithwaite), and *Vaccinium Oxyccos* in fruit, having been collected—the former on the boundary of Marsden moors, the latter on a marshy piece of ground in Slaithwaite, by J. Shaw. The specimens (upwards of 100) were named by E. Taylor; and afterwards Mr. T. Bartlam gave a very interesting lecture on "Structural Botany."—J. SHAW, Sec.

THE LEEDS NATURALISTS' FIELD CLUB AND SCIENTIFIC ASSOCIATION.
192ND MEETING, Oct. 27th, 1875.—Mr. W. Denison Roebuck, secretary, in the chair.—Mr. Charles Smethurst exhibited a pair (male and female) of *Sphinx Convolvuli*, both taken near Leeds. The male he took settled on a gate-post at Upper Wortley, on the 24th Sept.; the female was brought to him from Beeston, taken on the 25th. He also showed *Hydræcia micacea* and *Nonagria fulva*, taken in Burley Road, near Leeds, opposite Burley Church; the latter he had not before seen so near the centre of the town, though he takes it on Black Moor, near Adel; *Celaena Haworthii*, taken Aug. 16th, on Hebden Moor, Upper Wharfedale; *Cucullia scrophulariae*, two specimens, bred from larvæ brought by Mr. S. Scholefield last year, from South Cave, near Market Weighton; it occurs also at Bishopwood; and *Smerinthus tilæ*, bred from pupæ

from the south of England. On behalf of Mr. John W. Taylor were shown three species of *Achatinella*, a genus of mollusca which is mainly characterised by the spiral twist of the columella, and is curiously confined in its geographical range to the Sandwich Islands. The species partake of the same local character, being confined not only to particular islands, but to particular portions of them, the limits of range of each species seldom averaging more than five miles. *Achatinella (Bulimella) rosea* typifies the ellipsoidal arboreal species which characterise Oahu; while the conical form shown by *A. (Helicterella) apicata* is found mainly on the island of Kanai. The typical genus may also be considered as belonging to Oahu, *A. producta* being the largest of the genus. Numerous specimens of insects, arachnida, centipedes, and plants, were shown by the chairman, Mr. S. Scholefield, Mr. F. Emsley, and Mr. James Abbott.

193RD MEETING, Nov. 3rd, 1875.—Mr. John Grassham, and afterwards Mr. James Abbott, vice-president, in the chair. Mr. James W. Westmoreland, A.R.S.M., of the Bowling Iron Works, read an exhaustive paper on "The Manufacture of Steel," describing the various processes in use, and also giving the chemical analyses of the various products. In illustration, he showed some excellent diagrams and numerous examples.

194TH MEETING, November 10th, 1875.—Mr. Jas. Abbott, V.P., in the chair, and afterwards Mr. John

Grassham. Mr. Samuel Scholefield showed some objects under the microscope. Mr. John Grassham showed *Hydrous piceus*, one of the pair set so as to show the wings; also various moths. Mr. John W. Taylor showed *Helix virgata* and *Bulimus acutus*, from Freshwater, Isle of Wight, to show the variation, which was unusually great. There were two varieties of marking of the latter shell; the habits of the pale specimens are to be freely exposed, attached to the blades of grass in the downs, but the vegetation being dusty and grey-looking, the shells are not very conspicuous. The darker form lies hidden near the roots of the thick grass, and is but seldom fully exposed; and when found on the short grass of the downs is much paler in colour, approximating to the white form. The examples of *Helix virgata* showed variation to a remarkable degree, both in size and colour, within very narrow limits, the larger specimens being found amongst the more luxuriant vegetation.—Mr. John T. Calvert, of Keighley, mentioned that he had, the previous day, seen in the flesh a specimen of the rough-legged buzzard, which had been killed between Keighley and Skipton. A letter from Mr. F. G. S. Rawson, of Thorpe, near Halifax, was read, embodying ornithological notes made by Mr. Roger Earnshaw, of Ovenden, during the past three months.

195th Meeting, Nov. 17th, 1875.
—Mr. Jas. Abbott, vice-president, in the chair. Mr. John T. Beer,

F.R.S. Lit., read a paper entitled "Tidal Advances upon the coast of Kent, with indications of a former coast line, and of ancient submergence." In illustration he showed maps of the present and former coast lines of East Kent, and its geology; also Roman pottery dredged from the bottom of the sea off Herne Bay, fossils from the coast, and shells from a depth of 98 feet at the Goodwin Sands. The discussion was commenced by Mr. John Holmes, and continued by Messrs. John W. Taylor, Benj. Holgate and the chairman, and was of a most interesting character.—W. D. ROEBUCK, Hon. Sec.

LIVERSEDGE NATURALISTS' SOCIETY.—The usual monthly meeting of this Society was held in Millbridge School, on Tuesday, Nov. 2nd, the Rev. W. Fowler in the chair. Mr. Adamson, of Rawfolds, exhibited a young kittiwake (stuffed and mounted by himself), which was one of a flock that passed over Robert Town on Oct. 8th, and was seen to fall (probably from exhaustion) by a man working in the fields. The president showed the following species of foraminifera from the Atlantic (67 fathoms), in the microscope: *Globigerina bulloides*, *Spirillera vivipara*, *Planorbulina lobatula*, and *Ungeriana*, *Testularia pygmæa*, and young of *Miliola*. Specimens of haematite and other minerals were exhibited by Mr. J. M. Barber, and a good example of *Pecopteris* by Mr. Crosland.

NORTH STAFFORDSHIRE NATURALISTS' FIELD CLUB.—We have

received the annual report of this Club, and are pleased to find that it still maintains its position as probably one of the most flourishing societies of the kind in the kingdom. During the past season, eight excursions have taken place as follows: On April 12th, to Doveridge and Rocester; May 20th, to Cannock Chase; June 19th, to Dovedale; July 17th, to Rooches, in conjunction with the Manchester Clubs; August 3rd, 4th, and 5th, to Llanberis; August 20th, to Rowley Hills, in conjunction with the Dudley Geological Society; September 21st, to Cloud Hill, Bridestones, and Gorstonstone; and October 19th, to Chester. The Society numbers 325 members, with a balance in hand of £55 4s. 8d. The president is Mr. J. Ward, F.G.S., and the secretary, the Rev. T. W. Daltry, M.A., F.L.S.

OVENDEN NATURALISTS' SOCIETY.—The monthly meeting of this Society was held on Saturday, in the Society's meeting room, Queen's Head Inn, Illingworth, Mr. T. Robertshaw, president, in the chair. A number of geological specimens were exhibited and named by Mr. J. Spencer: *Cardiocarpions*, or fossil fruit stones; *Calamites cannaeformis*, by Mr. T. Cockroft, from Ringby quarries: *Ulodendron major*, and microscopic sections of fossil wood; *Stigmaria ficoides*; fossil spores, (two species) by Mr. J. Binns; *Trilobites*, Dudley silurian limestone, by Mr. S. Collins. Mr. Uttley Hartley presented to the Society a number of beautiful fossil ferns, including *Pecopteris* and *Neuropteris*,

from Barnsley coal strata. Mr. D. Wilson exhibited a case of foreign birds, containing a pair of manakins, green-throated humming bird, changeable-throated humming bird, tanagers, roller, and a number of others. Mr. T. Hirst exhibited the short-eared owl, shot at Denholme Wood, cock, shot at Ogden, and Chinese golden pheasant. Mr. R. Earnshaw exhibited a stormy petrel, which was caught alive in Commercial Road, Halifax, October 21st. This is the third of these rare birds which have been taken alive in the parish of Halifax: one about a year ago at Southowram, and another about 41 years since, at the Market Place bottom, Halifax. It is very rare to see one of these birds inland, except in the breeding season, and it is said that they are seen further from land than any other bird. That other rare bird, the knot, was shot on Warley Moor in September, and we believe this is the first record of this bird in the parish of Halifax.

RASTRICK AND BRIGHOUSE BOTANICAL AND NATURALISTS' SOCIETY.

—The monthly meeting was held on Monday evening, Nov. 8th, at Brighouse. The newly-elected president, Mr. Edwin Whiteley, occupied the chair. In opening the meeting the chairman congratulated the members upon the number of specimens exhibited, and the evidently increasing interest taken in the proceedings of the Society, and its endeavours to secure a good and useful library of scientific works. He trusted that the interest taken in the study of natural history would continue, and that next year

would find the Society richer both in numbers and knowledge.—Mr. Wentworth named the botanical specimens, 91 of which were upon the table, many of them, notwithstanding the advanced season of the year, being still in bloom, notably *Lapsana communis*, *Verbascum Thapsus*, *Chenopodium Bonus Henricus*, *Ranunculus flammula*, *Lysimachia nummularia*, *Mercurialis perennis*, *Pimpinella saxifraga*, *Borago officinalis*, *Pyrus communis*, *Myosotis arvensis*, and others too numerous to mention. Mr. G. L. Lister exhibited a number of fossil teeth (shark) brought from the Red Crag, in Suffolk.—W. M. TURNER, Sec.

STAINLAND NATURALISTS' SOCIETY.—This Society held its monthly meeting on Monday evening, Nov. 1st, Mr. J. Edwards in the chair. After the ordinary business, specimens, were exhibited as follows:—by J. E. Garside, male scoter duck, shot on the Calder by Mr. T. Jagger; by C. C. Hanson, eggs of lapwing, moor-hen, and landrail. A few woodcocks have been seen in this neighbourhood, and one or two shot. Fieldfares first seen on the 21st of October, and wild ducks and other northern emigrants have been more numerous than usual.—

CAIUS CASSIUS HANSON.

WAKEFIELD NATURALISTS' SOCIETY—Meeting Nov. 4th, Mr. H. Sims, vice-president, in the chair. Mr. Walshaw exhibited several fine specimens of geology he had collected at Scarborough. Mr. Talbot exhibited a remarkable variety of the

egg of the herring gull (*Larus argentatus*), collected at Filey, the ground colour being a very fine olive green, nearly white, with only three dark brown blotches on the larger end. A cordial vote of thanks was passed to John Bradley, Esq., Moor Cottage, who presented the Society with "Owens' lectures on the comparative anatomy and physiology of the invertebrate animals."—WM. TALBOT.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—The usual monthly meeting of this Society was held on Wednesday evening, Oct. 13th, at the house of Mr. Prest, Holgate Road. The vice-president, Mr. Wesley, was in the chair. The chairman exhibited the following rare birds' eggs: Cirl bunting, wood lark, reed warbler, grass-hopper warbler, great sedge warbler, stone chat, pied flycatcher, and crested titmouse. Mr. Robinson exhibited *Grapta C. album*, taken at Castle Howard during the excursion of the Society last month; also *Hopornisa Croceago*, *Xanthia Gilvago*, *Emmelesia ericotata*, and *Scotosia rhamnata*. Mr. Wolstenholme a very fine example of the green shank, shot on Clifton Ings; also very diminutive eggs of the hedge sparrow and yellow hammer. Mr. M. Smith exhibited the following specimens of coleoptera, most beautifully set, viz: *Cassida viridis*, bred, and *Hylobius abietis*. Mr. Helstrip exhibited the male and female Indian snake birds. The secretary, Mr. Prest, exhibited *Acherontia Atropos*, *Nola albulalis*, *Hyria auroaria*, *Acidalia emutaria*, *Nonagria*

Hellmanni; a fine variety of *Lupe-rina testacea*, taken at sugar near Holgate railway bridge; *Dasycampa rubiginea*, *Polia nigrocincta*, *Hadena rectilinea*, *Erastria venustula*, and *Agrotera nemoralis*. Mr. G. C. Dennis exhibited a splendid example of that rare bird, Montague's harrier, shot by Mr. Whytehead, at Acaster Malbis, near York, on the 14th of May last, and by a singular coincidence the chairman exhibited a specimen of the egg of this rare bird, and read a very graphic description from the *Field* of its nesting in the Isle of Wight. The secretary read a paper on "The Life History and Economy of the *Eupithecia albipunctata*" describing its various transformations, and illustrated by larvæ, pupæ, and imago; also beautifully preserved larvæ. The chairman presented the Society with a collection of birds' eggs.

MEETING, Nov. 10TH.—Mr. J. S. Wesley, M.B., in the chair. After the minutes of the last meeting had been read by the honorary secretary, the chairman exhibited three fine grayling, taken by himself in the river Wharfe, the day before. Mr. Dutton exhibited a pair of the wryneck, commonly called the cuckoo's mate, also eggs of the bird; Mr. Wolstenholme the eggs of the brambling or mountain finch, taken by himself at Castle Howard, last May; Mr. Webster a fine collection of mounted plants; Mr. Simmons the following lepidoptera: *Xanthia aurago*, *Xylina semibrunnea*, the new *Tortrix Ablabia argentana*, and a

fine series of *Lithosia aureola*, also a large box of very fine preserved larvæ; Mr. Robinson *Psodos trepidaria*, *Acidalia strigilata*, *Lithosia muscerda*, *Cucullia asteris*, *Chesias obliquaria*, *Dicrocampa plumbana*, *Ephippiphora grandevana*, and *Eupacelia roseana*; The secretary, Mr. Prest, *Xylina conformis*, bred this season, *Acidalia contiguaria*, taken by Mr. Capper, of Liverpool, in North Wales; a fine-bred series of *Asthenia Blomeri*, *Sesia chrysidiiformis*, a fine series of *Rhodophæa suavella*, *Tortrix diversana*, *Leptogramma boscana*, and a fine pair of the rare *Acanthocinus ædilis*. After passing a vote of thanks to the chairman, the meeting separated.

Answers to Correspondents.

WAXWING.—W. D. Roebuck.—The bird referred on p. 57, was, as you indicate, "Waxwing (*Bombycilla garrula*)". We are obliged by your pointing out the error.

Vespa synagris.—W. D. Roebuck.—P. 64: like yourself, we do not know the wasp referred to, and we were doubtful of the MS. in which it was called "Vesta." Perhaps our correspondent, on seeing this note, will be able to read the riddle.

ORCHIDACEÆ AT WETHERBY.—Mr. J. S. Wesley requests us to state that after the words "but not" (p. 57, line 23), the word "*aranifera*" should be inserted. It was missed out in the MS., and we were somewhat puzzled as to the meaning: this clears up the obscurity.

Diary.—Meetings of Societies.

- DEC. 1. Entomological Society of London. Leeds Naturalists' Field Club and Scientific Association : Paper, "Some of the Elements considered as Compounds," — by Thos. Fairley, F.R.S.E., and F.C.S.
- „ 2. South London Entomological. Linnean Society.
- „ 4. Huddersfield Naturalists' (Annual Meeting) : Closing Address of President, G. T. Porritt, F.L.S.
- Mirfield Naturalists' : Paper, "The Flora and Fauna of the Carboniferous period." — Mr. Joseph Tindall.
- „ 8. Leeds Naturalists' Field Club and Scientific Association, Conversazione and Exhibition of Specimens. Goole : Paper, "The expressions of the emotions." — M. A. Morris.
- „ 15. Leeds: Paper, "The Structure of *Amphioxus lanceolatus*."
- „ 16. Linnean Society. South London Entomological Society.
- „ 30. South London Entomological Society.

THE NATURALIST is published on the first of every month ; Subscription, 4/- a year, post free, payable in advance.

N.B.—The Editors will be obliged if those gentlemen who have not already sent their Subscriptions, will be kind enough to do so ; and any gentlemen desirous of subscribing should send their names without delay.

COMMUNICATIONS have been received from Messrs. Jas. Bagnall, Dr. H. F. Parsons, W. Talbot, Thos. Lister, Sheffield Naturalists' Society, &c.

EXCHANGE.

I have a few specimens of *Epunda lutulenta* and *Xanthia aurago*, which I shall be pleased to distribute amongst northern lepidopterists, on receipt of box, with return postage. Or, I shall be glad to exchange them for northern species.—(REV.) P. H. JENNINGS, Longfield Rectory, Gravesend.

DUPLICATES.—*T. W. Album*, *Neustria*, *Empyrea*, *Tincta*, *Hastata*, *Hexapterata*, *Omicronariu*, *Testata*, *Conigera*, *Gilvago*, *Gonostigma*, *Templi*, &c., &c.—John Harrison, 7, Victoria Bridge, Barnsley.

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No. VI.

JANUARY, 1876.

VOL. I.

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HUDDERSFIELD :

B. BROWN, MARKET PLACE CORNER.

TO CORRESPONDENTS.

The Editors will esteem it a favor, if the Secretaries of Field Clubs and Naturalists' Societies throughout the Kingdom will favor them with occasional Notes of their proceedings and Excursions, when of interest.

Papers read at Meetings of these Societies, or otherwise, on any branch of Natural History, will be gladly received and inserted in full, if of sufficient general interest, or in abstract, if of only local interest.

All communications, except Advertisements, Exchanges, or Short Queries, should, if possible, be in the hands of the Editors not later than the 18th of the current month, to insure insertion in our next issue, and should be written on one side of the sheet only.

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Original Articles.

THE BIRDS OF WAKEFIELD:

With particulars of the occasional visits of Rare Species, and of those that have been observed to breed in the neighbourhood,

FROM 1845 TO THE PRESENT TIME.

BY WILLIAM TALBOT.

FALCONIDÆ.—(Continued).

RING OUZEL (*Turdus torquatus*)—

One shot at Warmfield, and one near Balne Beck. Three years ago, I, with a friend, visited Hebden Bridge and the Calder Valley, towards Todmorden, for the purpose of observing these birds in their breeding quarters. In a space of $2\frac{1}{4}$ miles we found no less than thirteen nests. The male bird seems very timid and shy. The field naturalist who has once heard its song will not easily forget, or fail to recognize, it again.

GOLDEN ORIOLE (*Oriolus galbula*)—

The late Mr. Johnson, of the Nag's Head Inn, Wakefield, received a specimen of this bird to be stuffed, which had been shot at Bottom Boat. I saw the bird before it was skinned; it was in splendid plumage.

SYLVIADÆ.

HEDGE ACCENTOR (*Accentor modularis*)—

Locally Hedge Sparrow, or Dickey Dunnock, breeds abundantly in this neighbourhood. I have seen the nest with eggs in, as early as the 15th of March.

REDBREAST (*Erythaca rubicula*)—

Is plentiful both in town and country. It breeds in most extraordinary and unlikely places. A short time ago a pair built their nest between two bales of coir yarn, in an exposed situation in the Prison yard, where the prisoners were continually passing to and fro.

REDSTART (*Ruticilla phœnicurus*)—

Breeds freely round Wakefield. Its song is very sweet, but short, and to an inexperienced ear scarcely distinguishable from that of the Whinchat. The earliest date I have noted its

arrival is the 9th of April, and for many years not later than the 28th.

STONECHAT (*Saxicola rubicola*)—

Breeds occasionally in this district. I have found its nest at Ardsley and on Brierley Common. Mr. Parkin has shot several specimens in the immediate neighbourhood.

WHINCHAT (*Saxicola rubetra*)—

Is plentiful in the outskirts of the town. It is surprising to find this bird, every spring, visiting exactly the same localities, even the same posts and rails. There are three places I have noted, where, for several successive years, I have observed it some days sooner than in any other part of the district. Any one who has noticed it during incubation, will have been struck with the plaintive notes "Yew-tick, Yew-tick-tick," which it utters when disturbed. My earliest date of its arrival is the 9th of April.

WHEATEAR (*Saxicola Oenanthe*)—

This bird is generally the first of the spring migrants to arrive in the neighbourhood of Wakefield. It occasionally breeds with us; its nest has been found on the Railway Embankment at Oakenshaw, and at Brierley and Hiendley Commons. The 30th of March is the earliest date I have observed it. Mr. Illingworth, of Horbury, reports its arrival in 1873, on the 23rd of March, and Mr. Wilcock tells me he saw it adjoining the Newton Moor Nurseries on the 24th of the same month.

GRASSHOPPER WARBLER (*Salicaria locustella*)—

Breeds at Haw Park, Ryhill Pits, Nostell, King's Wood, and Bullcliffe Wood. I have always found its nest on the ground, amongst rough grass, the tops of which it draws together so as to form a dome over it, and frequently there is an arched passage constructed, from 12 to 15 inches in length, leading to the nest. When started from its nest, it runs amongst the grass, and from its appearance one would easily be led to suppose it to be a rat. The ornithologist who has once heard its song cannot fail to recognise it again. I have not noted its arrival before the 20th of April.

SEDGE WARBLER (*Salicaria Phragmitis*)—

Breeds abundantly in the outskirts of the town. I have

frequently been told by people who have been out in the country late in the evening that they had heard the Nightingale ; when I have imitated the notes of the Sedge Warbler, they have at once exclaimed, "Yes, that's it !" Many people are under the impression that the Nightingale is the only bird that sings in the night time, and on hearing the song of the Sedge Warbler, which is but a feeble imitation of that of the Nightingale, they at once jump to the conclusion that they have heard the famous songster. The Sedge Warbler is very abundant in Haw Park, where I have heard it at all hours of the night when I have been out moth collecting.

REED WARBLER (*Salicaria arundinacea*)—

Makes its appearance in only a few localities in the neighbourhood. It occasionally breeds at Methley, Kirkthorpe, Walton Hall, and Hemsworth Dam. It is remarkably shy, and of solitary habits, and can rarely be seen except when carefully looked for amongst the reeds. Its nest, which resembles a funnel in shape, is supported by the reeds, to several of which it is interwoven to make it more secure. On measurement I have found its nest as much as thirteen inches in length from top to bottom. I have not observed the presence of this bird in our district before the 22nd of May.

NIGHTINGALE (*Philomela luscinia*)—

I first made acquaintance with this bird in 1841. I well remember that in that year Mr. George Hall, of Wakefield, who was then known as "the Nightingale Catcher," had been to Rossington Bridge, and had there caught a Nightingale, and had also brought with him some thousands of Ants with which to feed it, greatly to the annoyance of the neighbours, whose houses they invaded most unceremoniously. Being anxious to hear more about the capture of such a rare bird, I asked many questions of Mr. Hall, who lived near me, and, eventually, he invited me to accompany him the following Saturday, when he intended going from home on the same errand. Until we started out he would not say where he was going, but when he saw I really meant to accompany him he told me that our destination was Burnt Wood, about ten miles from Wakefield. We arrived there at 7 p.m., and shortly after eight o'clock the Nightingale began to sing. I shall never forget hearing the first few notes, and how anxiously I watched my companion, who

showed great skill in baiting his spring traps with the common meal-worm, and placing them in the most likely places to allure the bird. After many fruitless attempts to catch it, we were compelled at last to give it up, and return home. However, I felt richly repaid for my long walk, by hearing the wonderful songster.

On the following Tuesday, Mr. Hall went again, and he afterwards told me that he had no sooner put down his traps than he had caught the bird. I saw it in a cage a short time after, and was astonished to find it quite tame. Its food was raw beef, hard boiled eggs, ants, and ants' eggs, and occasionally a meal-worm.

The next time I heard one was in May, 1861, when I was in Edlington Wood, near Doncaster, entomologising with Mr. B. Gibson.

On the 21st of May, 1870, I had another opportunity of hearing it, at Coxley Valley. On reaching the place, about 10 p.m., I found a large number of people standing, wrapped in silence, on the footpath which skirts the wood, and, to our intense delight, from a bush about fifteen yards off the footpath, the Nightingale was pouring forth its delightful notes, which it continued for half-an-hour in an uninterrupted stream of melody. Upon our return, we could hear its strains until we reached Coxley Dam, a distance of half-a-mile.

The next time I had the privilege of hearing the Nightingale was on the 6th of May, 1871, when I accompanied Mr. T. Lister, of Barnsley, to New Park Spring, Great Houghton, for the purpose of hearing it. On our arrival there at 8 p.m., we found it in full song, and, entranced by its notes, we remained until 11-30, when, though reluctantly, we left. For nearly a mile, however, we could still hear its delicious music resounding through the midnight air. I made a second visit shortly after, in the day time, and was pleased to find its song almost equally delightful as in the night time, though it had a formidable opponent in a song thrush, which strove hard to obtain the mastery. Mr. Tomlinson, the woodman, whose cottage was close to the nest, afterwards told me that for several days after the young birds had left the nest, he saw them sporting in his garden. I was very glad to hear that they had reared their brood successfully.

(*To be continued*).

DICRANURA VINULA:

OR,

THE PUSS MOTH—(Concluded).

BY S. BAIRSTOW.

WHILST recommending *D. Vinula* in the highest possible terms to the consideration and imitation of all true lovers of industry, I would still desire to pass over as unworthy of emulation the *Vinula*'s tail-eating propensity. It surprises me, however, to think that Darwin should have omitted such an important and forcible problem in the Monkey Euclid; and that that gentleman who something like a century and a half ago surmised our tails had *once* been, but by dint of long usage and long sitting, had entirely worn out, should not have been more struck with the puss tail-eating propensity as a solution, than the long-sitting propensity, is amazing. When I get as great a gun, as clever a man, as Darwin (I speak reverently, for to him be all honour due for his grand promotion of scientific theory and FACT in the nineteenth century), I will write a book for the coming million, entitled "Tail-eating Evolution, *versus* Tail-by-rubbing Dissolution," or "Non-Darwinii sed Tailii."

It is now, there appears a wonderful alteration in the larval department. The colour changes to a duller, more dismal hue; its natural inertness gives place to the sharp activity of a little busy-body. Fussy, hasty, never tired until satisfied, this little fellow trots about into every nook and corner, overturns every obstacle (or if it cannot overturn, walks over it), until at last with comfort and ease, with solitude and tranquillity, it can find a spot whereon to lay its head, whereon to sleep the semi-death of pupa-hood, and rise again in the resurrection of a perfect snow-white sylph. Now it is that instinct plies intuitively its skilful oar; now it is that Mr. P. says—"Adieu, friends; adieu poplar leaf; adieu ichneumon flies, my dreaded enemies; brother, whose tail I have nibbled off—adieu":—and then, wrapping up itself within itself, falls (after a long struggle to kick off its final suit of clothes) into the arms of Morpheus.

This larva exhibits a wonderful aptitude for weaving its horny cocoon and in its work uses a kind of substance consisting of a tough, gummy, horny nature, catching atoms of the substance on which it spins to interweave with its cocoon. Place it in a cardboard-box to build

its invincible tower, and the result is a cardboard-box bespattered prison; place it in a drinking glass, and the result is a similarly coloured transparency; or place it on the trunk of a poplar tree, and it requires an experienced and discerning eye to detect it; and so hard is the cocoon that it is with considerable difficulty that a knife or sharp instrument can remove it. The substance with which it encloses itself seems to be inexhaustible, and the larva never abates its energies until the reservoirs of production have gradually disappeared. Like Dr. Kenealy, "He never will be persuaded to hold his tongue, until Old Time has worn that indefatigable member of loquacity to the roots." I believe the shape and construction of the future imago is formed in the insect, even in its primary larval condition: time having perfected what food and activity could not accomplish. The puss larva at this period adopts a fasting policy and awaits fretfully for a future transition. The chrysalis (or pupa, or aurelia) is rather actively inclined, of a dark brown black shade, and in other respects similar to the usual run of pupæ. The food which it has obtained hitherto is by this time perfectly digested, and all excreta are absorbed in the intestinal tubes. It resides in the cocoon until the following year, when the moth appears about May, June, or the beginning of July. On emerging from the chrysalis, the imago is covered with a beautiful woolly snow-white clothing, which gradually (*misere meo*) disappears and leaves the moth *Dicranura Vinula* him or herself. How strange that the hard, impenetrable, buckhorn exterior of the casing should succumb to the sieges of a little moth's mouth-liquid battery! But so it is! Pussy, who easily entombed herself with a ten-barred door, as easily removes it. No ordinary safe is Vinula's. Without any of Chubb's 30-chambered locks she lets herself out by the action of her mouth. What a grand discovery for burglars! Now she appears in all her poor grandeur of perfect symmetry. I say "poor" and use the term advisedly, for "born to death" is the funeral note rung in her ears, but after having a final taste of pleasure, pleasure dearly bought, but honestly; after settling her worldly affairs she disappears for ever, leaving but her name and example for those who come after to imitate. It is a pity that so fine an English moth should be equally difficult to preserve, but so it is, and as yet it cannot be effectually remedied. Acids, stuffing, turpentine, all are of no avail, the infernal grease will ooze out, and soon poor pussy is a black mass.

ON THE SEXUAL REPRODUCTION OF FERNS AND MOSSES.*

BY JAMES BAGNALL, BIRMINGHAM.

A QUESTION was raised at one of our recent botanical section meetings, as to whether ferns hybridise. My friend Mr. Morley asserted that hybridisation was impossible in ferns; whilst Mr. Latham and myself contended that hybridisation was not only possible, but that probably it was of frequent occurrence among these plants. Time would not allow the matter to be discussed on the evening in question, and as it is one of some interest, I have brought it forward again for further consideration. With the development of ferns, from a practical point of view, I am only slightly acquainted; but to that of the mosses I have given some little attention, and as there are many analogies in the development and reproduction of these two classes of plants, I think that if I can show, as I hope to do, that hybridisation is a very likely circumstance in the mosses, we may naturally infer that the like circumstance may also take place in the ferns.

But before discussing this question of hybridisation it is requisite that a few words should be said on the reproduction of ferns and mosses. I have, therefore, endeavoured to sketch out briefly a history of this matter. Both ferns and mosses are cryptogamous plants, developed normally from small cellular bodies termed spores. These spores vary in size, form, and external markings, but agree in being mere cellular bodies, having two coats or coverings, an inner and an outer one, enclosing a grumous or granular mass, differing from the seeds of flowering plants in having no trace in their structure of an embryo; hence these plants are called *Acotyledons*.

When we sow the seed of the flowering plant, if it germinates, it gives rise to a plant similar to the plant from which the seed was taken; but the spore of a fern or moss on germinating gives rise to a structure very *unlike* the plant on which the spore was developed, called in the one case (that of ferns) a prothallus, in the other (that of mosses) a protonema, and from this prothallus or protonema plants arise similar to the plant on which the spore was developed; this is called the alternation of generations, or, in other words, the son is not like the father, but like the father's father.

* Read before the Birmingham Natural History and Microscopical Society.

In ferns, when the spores germinate the outer coat of the spore bursts, and the inner coat is protruded, and by frequent cell division expands into a thin *Marchantia*-like structure called *Prothallus*. On the lower surface of this prothallus, after a while, minute papillæ-like bodies are formed, seeming somewhat similar when seen with a low magnifying power, but found to be very different when more highly magnified. These are the organs of reproduction, and are termed the *Antheridia* and *Archegonia*.

The *antheridia*, or male organs of reproduction, are somewhat spherical bodies, and consist of cellular papillæ, having a central cavity containing free cellules ; each of these free cellules when more fully matured contains a small ciliated spiral body, which is called the *Spermatozoid* or *Antherozoid*.

The *archegonia*, or female organs of reproduction, are larger, consist also of cellular papillæ, and when very young are somewhat dome shaped, with an apiculus or neck. In the centre of this neck later on, may be traced a closed canal leading to a central nucleated cell, which is embedded in the substance of the prothallus, but before the complete formation of the canal I have mentioned a secondary free nucleus is formed in the central cell of the *archegonium*. This is the germinal vesicle.

After a while the closed canal opens externally by the absorption of some of the cells bounding its upper part, thus allowing a free passage from without into the interior of the nucleated cell, and according to the observations of Hofmeister, the spermatozoids of the *antheridia* pass down this open canal and ultimately reach the interior of the central nucleated cell. Here they sport actively around the germinal vesicle, and by their agency the fertilization of this cell is brought about. The canal now again closes, and the germinal vesicle, by frequent cell division, increases in size, forming at length the bud of the future plant, and from this bud the fern plant, bearing its leafy fronds, and on these in due time the sori, or fruit, is developed.

I have not attempted here to give an account of the development of the sori and spores ; the subject is complex, and would require a special preparation of slides for its proper illustration. Nor have I attempted to give a detailed account of the development of ferns from buds, or *gemmae*. I have merely treated of the normal development of these plants.

When the spores of mosses germinate, they usually give rise to a

confervoid thread-like growth, called the pro-embryo, or protonema. In some mosses, however, such as the *Sphagna*, or bog mosses, the spores, on germinating, give rise to a flattened *Marchantia*-like structure, somewhat similar in appearance to the prothallus of a fern, agreeing, however, in similarity only. The protonema is formed by the protrusion of the inner coat of the spore. This, by rapid cell division, becomes much elongated and branched. The primary branch, at first green, frequently turns brown, and in some cases penetrates the ground, thus performing the functions of a root. The secondary branches, however, are well charged with chlorophyll, and branch and branch again repeatedly. The protonema of mosses may constantly be seen forming a green, velvety mass where mosses are found fruiting, more especially after wet warm weather, and looks very like the smaller conferva. If a little of this mass be examined with a moderate magnifying power, it will be seen that at or near the base of some of the secondary branches a small bud-like body is developed. This is the first bud of the moss plant, and this bud-like body grows by continually repeated divisions of the apical cell, until at length the first rudimentary leaf is given off; growth still continues, and ultimately the leafy moss is developed.

The various stages of development may often be traced by carefully examining a small mass of protonema. In most mosses this protonema is short-lived, and perishes before the moss is fully grown; but in some of the lower forms, such as *Phascum serratum*, it is permanent, lasting throughout the life-time of the plant. The examination of such mosses is both instructive and interesting, as we may often see at one glance the whole life history of the plant—the germinating spore, the protonema, the fruit and its spores.

We saw that in the case of the ferns the organs of reproduction were developed on the *Marchantia*-like structure, formed from the inner coat of the germinating spore; but in the mosses these organs are not developed until the leafy moss plant is fully grown, and occur as bud-like bodies in the axils of certain of the leaves, either at the top, the side, or the base of the stem, according to the class or species examined.

These may be seen with an ordinary field lens, and if carefully dissected will be found to consist of a number of leaves enveloping the organs of reproduction—the *antheridia* and *archegonia*. The leaves surrounding the *antheridea* are called the perigonial leaves, whilst those surrounding the *archegonia* are called the perichaetial leaves; and I may also state here that the male bud is usually smaller than

the female bud. The *antheridia* are small, stalked club-shaped or sac-shaped bodies, when fully matured, and in all true mosses occur in greater or smaller numbers, intermixed with certain filamentous jointed bodies called the paraphyses, which paraphyses probably serve as organs of nutrition. In the bog mosses these paraphyses are absent, and the *antheridia* consists of a longish stalk surmounted by a globular body. If these *antheridia*, or male reproductive bodies, are examined with a power of from 100 to 150 diameters, they will be seen to contain a large group of small cellules adhering firmly together, and in each of these cellules a small spiral thread will be seen; this is the spermatazoid, or fertilizing principle of the moss plant, and may be considered as analogous to the pollen tube of flowering plants. If ripe *antheridia* be examined on a slide with a little water, the slightest pressure of the thin cover glass will cause them to burst at the top, and instantly you will see the free cellules contained, swarming out with a sort of jerky motion. In a few minutes the cellulose coat of these cells is absorbed, and the spiral ciliated bodies, the antherozoids, thus liberated, commence moving about in the water, after the fashion of some *infusoria*. This is a beautiful sight, and may readily be seen by getting some of the male flowers of *Polytrichum commune*, plentiful at Sutton about the end of May. The outer leaves should be carefully removed, and some of the *antheridia* should be examined in water with a $\frac{2}{3}$ objective.

The *archegonia*, or female reproductive organ, may exist in the same bud as the *antheridia*, or in separate buds, according to the species examined. These are somewhat longer and more slender than the *antheridia*; they are somewhat vase-shaped, and consist of a neck, which is at first filiform, but widens below into an inflated oval or pyriform body. In the centre of this oval or inflated portion, near the top, will be seen a nucleated cell (better seen if a section be so made as to pass through the archegone longitudinally—a rather difficult and delicate matter). This nucleated body is the germinal vesicle, and after the *archegonium* has acquired some size, a closed canal will be seen passing down the neck into that part of the oval body in which the germinal vesicle is situated. After a while the cells bounding the top of this closed canal are absorbed, thus leaving a free passage down the open canal to the germinal vesicle. Down this canal the spermatozoids pass, reaching at length the germinal vesicle. After this has taken place, the germinal vesicle, by a merismatic cell division, becomes divided—first, into two nucleated

cells; each of these cells again subdivides, and ultimately by repeated cell division the fruit rudiment is formed. During this process the archegone increases in size considerably, the rudiment also increasing both in vertical and horizontal growth, striking deep down into the base of the *archegonium*.

(*To be continued.*)

Short Notes and Queries.

To the Editors of the Naturalist.—On the 6th instant a fine specimen of the great northern diver (*Colymbus glacialis*) was shot at Coldhiendly reservoir, near Wakefield. On the same day, an adult female of the red-throated diver (*C. septentrionalis*) was shot, and on examining the contents of the stomach, it was found to contain 165 small fishes, averaging $1\frac{1}{8}$ inches in length. I forwarded them to an experienced angler, and he informed me that they were all young roaches. This is the fourth red-throated diver which has visited this neighbourhood since the 3rd of October.—

W.M. TALBOT.

Wakefield, 11th Dec., 1875.

Reports of Societies.

BRADFORD NATURALISTS' SOCIETY.—Meeting Nov. 29th. the president, Mr. John Carter, in the chair. — Mr. E. Beaumont exhibited a number of specimens of lepidoptera from his cabinet, including *Acherontia Atropos*, *Chærocampa Celereo*, *C. porcellus*, *Catocala nupta*, &c. A very interesting and instructive paper on "Fossils" was read by Mr. Edwd. Margerison, after which a discussion ensued, in

which several of the members took part.

GOOLE SCIENTIFIC SOCIETY.—Meeting Dec. 15.—The president, Mr. M. A. Morris, read a paper on the "Expression of the Emotions." After alluding to the paucity of literature on the subject, and acknowledging that his paper would be mainly a *résumé* of Mr. Darwin's work on the subject, the author enunciated and illustrated the three chief principles of emotional expression, viz., that of serviceable association, of antithesis, and of nervous construction. The principal means of investigating the subject were the observation of human features and gestures, especially those of children and savages, under the influence of different emotions; comparative observations on the lower animals; the study of works of art and of actors; consideration of the anatomy of the facial muscles and nerves, and direct experiment. Passing briefly over the gestures of the lower animals, the author described the outward marks of the different expressions in man with considerable minuteness, and at some length. An interesting discussion followed, in which the blanching of the hair under the influence of terror was alluded to, instances

being known to some of the members. It was resolved that certain scientific publications should be taken in by the Society for circulation among the members.—
H. FRANKLIN PARSONS, M.D., Sec.

HUDDERSFIELD BOTANICAL SOCIETY.—At the usual monthly meeting held on the 21st of November, a considerable number of plants were exhibited, both in fruit and flower, amongst them being *Aster Tripolium* (Canal Bank, Slaithwaite, probably an escape from a garden). *Galeopsis versicolor*, *G. Tetrahit*, *Juncus diffusus* Hoppe, *Linaria Cymbalaria*, *Sonchus arvensis*, *Veronica Buxbaumia*, *Vaccinium Myrtillus*, very full of fine fruit. After Messrs. John Shaw and E. Taylor had examined and verified the plants exhibited, Mr. E. Taylor gave a short but very concise description of different varieties of roots of plants, and their uses in the economy of nature. The lecture was illustrated by a diagram of twelve different kinds of roots.—
J. TINDALL.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting Nov. 22nd, the president, Mr. G. T. Porritt, in the chair.—Mr. Edward Taylor presented to the Society a fine mounted specimen of the curlew (*Numenius arquata*). Mr. Lister Peace presented a collection of local birds' nests and eggs. The Rev. P. H. Jennings, M.A., of Gravesend, sent a box of beautiful specimens of *Epunda lutulenta* and *Xanthia aurago*, for distribution amongst the lepidopterists of the

Society. Mr. George Brook presented to the library three volumes of Professor Owen's "People's Lectures," &c. Votes of thanks were accorded to the various donors. After the ordinary business, Mr. S. L. Mosley read a paper on "Entomology in 1875."

HUDDERSFIELD NATURALISTS' SOCIETY.—The annual meeting of the above Society was held on Saturday, 4th December; the president, Mr. Geo. T. Porritt in the chair. The secretary read the report for the year, from which it appears that the Society is in an active and healthy condition. New branches of study have been taken up by the members, while the older and more favourite ones are constantly gaining ground. The cash account shows a balance of £31 12s. 9d. in favour of the Society, and the museum and library are estimated in value at £213. After this follows a list of the papers read during the year, which call for the thanks of the committee to their authors. They also tender their hearty thanks to Alfred Beaumont, Esq., Edward Brooke, Esq., F.G.S., W. Cash, Esq. (Manchester), Messrs. Lister Peace, Edward Taylor, Geo. Brook, and C. P. Hobkirk, for having so generously added standard works to the library, and valuable specimens to the museum. The library report shows an increase in the number of books circulated, being chiefly in the sciences of botany and conchology. Amongst the many evidences of progress during the year, a *Natural History Magazine* has again been com-

menced, under the able editorship of Mr. C. P. Hobkirk and Mr. Geo. T. Porritt, F. L. S. Five numbers have already been issued, and it is hoped that by the combined assistance of the various Naturalists' Societies in the West Riding, the journal may be made a permanent success. For a long while the Society has wanted something in which to store local specimens. A cabinet was suggested, and the patrons were appealed to for pecuniary assistance, and they most generously came forward and defrayed the entire cost of the cabinet. The following is a list of the donors :—The Right Hon. the Marquis of Ripon ; The Right Hon. the Earl of Dartmouth ; L. R. Starkey, Esq., M. P. ; E. A. Leatham, Esq., M. P. ; Thomas Brooke, Esq., J.P. ; Wm. Brooke, Esq., J.P. ; Alfred Beaumont, Esq. ; Mr. Edwin Sykes, Mr. R. Jessop, Mr. Ed. Taylor, Mr. J. Tindall, Mr. H. Kaye, Mr. Wm. Milner. Now it only remains for members to stock the cabinet. Much has already been done, and it is to be hoped that in another year the cabinet will form a good representative of local flora and fauna. The meetings of the West Riding Consolidated Society have been as successful as ever, and more light has been thrown on local species. Finally, the committee sincerely trust that the success which has hitherto attended the operations of this Society may still continue to increase, so that before long more commodious premises may be obtained. The election of officers then took place, and resulted as

follows :—president, Mr. G. T. Porritt, F.L.S. ; vice-presidents, Mr. C. P. Hobkirk and Mr. Joseph Tindall ; treasurer, Mr. George Liversedge ; hon. corresponding secretary, Mr. Geo. Brook, jun. ; financial secretary, Mr. E. Porritt ; librarian, Mr. E. Taylor ; curator, Mr. J. Conacher ; and nine members of committee.—Mr. Hobkirk presented a fine collection of botanical specimens.—G. BROOK, Hon. Sec.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—196th Meeting, Nov. 24th, 1875.— This was a specially convened general meeting of the Society, to consider its laws. It was resolved that the whole of the existing laws be repealed, and a new code was substituted.

197TH MEETING, Dec. 1st, the president in the chair.—Mr. Thos. Fairley, F.R.S.E., F.C.S., Public Analyst to the Borough of Leeds, delivered a most interesting lecture on “Some of the Elements considered as Compounds.” Having sketched the history of the idea of molecules of the elements as distinct from atoms, he showed how that idea might be further applied to the explanation of many phenomena hitherto not understood. The lecture, which was illustrated with experiments, was most instructive and interesting. A very animated discussion followed.

198TH MEETING, Dec. 15th, the president in the chair. Mr. Fredk. Greenwood, M.R.C.S.E., resident curator of the Leeds School of Medicine, read a paper on “The

Structure of *Amphioxus lanceolatus*." Having shown in a brief historical sketch that British naturalists have had a large share in the first investigations of this singular creature, he described its external aspect, especially noticing the median fin-rays. The lateral cutaneous folds were shown to be dependent on the state of distension of the body cavity. The semi-cartilaginous hoop surrounding the aperture of the mouth was described, with its tentacles, or cirrhi; also the cavity of the mouth with its three openings, viz., two lateral slits and a median orifice, which is the true mouth. The great branchial sac was next described, and shown to consist of a delicate basket or cage of cartilaginous fibres, and is perforated with slits through which the water passes freely into the body cavity, finally escaping by the abdominal pore. The circulatory apparatus was then described. A large vessel running along the lower border of the branchial sac gives off contractile branches opposite alternate branchial bars; these branches are distributed over the walls of the branchial sac, and then unite to form a dorsal vessel which redistributes the blood to the body. The intestines were shown to be extremely simple, a blind pouch being the only representative of the liver. That it is so is proved by its having a portal circulation. The existence of canals which represent renal organs, was also mentioned, and the paper concluded with a comparison of the general structure with that of the Lamprey. Specimens of both fishes were shown,

also microscopic slides showing the details of structure in *Amphioxus*; and a neat diagram was also made use of.—W. D. ROEBUCK, Hon. Sec.

OVENDEN NATURALISTS' SOCIETY.

—The monthly meeting of this Society was held on Saturday evening, Mr. T. Robertshaw, president, in the chair. There was a moderate attendance of members. Mr. T. Hirst exhibited a number of birds, including dunlin, spotted sandpiper, a pair of pheasants, and a pair of greenshanks, from America. The secretary read the balance sheet for the year, which showed the society to be in a flourishing state. During the year twelve new members have been added to the Society, and seven volumes of books to the library, and a large number of geological specimens have been collected.

RASTRICK AND BRIGHOUSE NATURALISTS' SOCIETY.—Meeting Dec. 13th, Mr. Edwin Whiteley in the chair. The botanical specimens numbered 26, and were named by Mr. Wentworth. Amongst them were *Calendula officinalis*, and *Potentilla Tormentilla*, in bloom. Mr. G. L. Lister exhibited and named a number of geological specimens, from the middle coal measures of Low Moor, including some fossil teeth (*Megalichthys* and *Strepsosaurus*, an *Icthyadorulite Pleuracanthus Lavissimus*—) and some ferns. Mr. W. Kaye exhibited a number of beautiful shells (*Helix*) which had been found amongst corn imported from Egypt.—W. M. TURNER, Sec.

SHEFFIELD FIELD NATURALISTS' SOCIETY.—The annual meeting of this Society was held 18th Nov., in the Cutlers' Hall. Mr. W. Baker, A.R.S.M., the president, occupied the chair. Mr. F. Brittain, the honorary secretary, read the annual report, which stated that the number of members had considerably increased during the past year. At every general meeting several new members had been enrolled, and there was reason for believing that in the course of time the club may be exceedingly popular. At the first meeting held during the year, a rule was adopted, by which ladies were admitted to the club upon payment of a subscription of five shillings, and the committee had noticed with satisfaction that since then several ladies had been elected. A soiree was held in January, at which the president, Mr. W. Baker, read a paper on the lower forms of vegetable and animal life, illustrated by the aid of oxy-hydrogen light. On the same occasion, Mr. H. C. Sorby, F.R.S., who is now president of the Royal Microscopical Society, exhibited a very interesting microscope, constructed after designs supplied by himself. At a general meeting held in March, Mr. H. C. Sorby read an interesting paper upon his recent researches into the colouring matter of birds' eggs. The lecture was ingeniously illustrated by bands of coloured paper showing the spectra of the various kinds of colouring matter. Early in May the second soiree was held at the Cutlers' Hall, when the president, Mr. W. Baker, delivered

a lecture on structural botany, with illustrations by oxy-hydrogen light. The committee had been regularly in communication with the Leeds Naturalists' Field Club. The excursions were much better attended than in previous years, and the members present appeared much pleased with the districts which had been chosen for explorations. There were four excursions during the season—viz., to Castleton, Anston Crags, Bakewell and Lathkill Dale, and Osberton. The committee expressed their obligation to F. J. S. Foljambe, Esq., M.P., for his courteous invitation to Osberton in August. The report was adopted, and the following gentlemen were elected officers for the ensuing year:—president, Mr. W. Baker, A.R.S.M.; vice-presidents, Mr. H. C. Sorby, F.R.S., and Dr. Hime; hon. treasurer, Mr. J. Newbould; hon. secretary, Mr. Fredk. Brittain. H. Seebohm, Esq., then read a paper on “The migration of birds in the valley of the Lower Pitchora,” illustrated by examples of some of the rarer birds and their eggs. Amongst these were skins, nests, and eggs of a new species of pipit, which will be described in “Dresser's Birds of Europe,” as *Anthus Seebohmi*, eggs of grey plover and little stint, of which few or no authentic examples have been hitherto known, eggs of Bewick's swan, and the Siberian chiffchaff, hitherto unknown, and skins of the Kamschatka titmouse, and Siberian chiffchaff, hitherto unknown to Europe. On the tables were displayed in glass cases several birds and eggs alluded to by Mr.

Seebohm. It was incidentally mentioned that the paper read, was also read on the 16th by that gentleman before the Zoological Society of London, which holds its meetings in Hanover Square, the chairman (Mr. Salvin) stating that he had not seen such rare specimens of ornithology since Woolley's return from Lapland many years ago.

WAKEFIELD NATURALISTS' SOCIETY.—Meeting 2nd December, Mr. H. Sims in the chair.—Mr. Dickson exhibited the following fungi :—*Agaricus (Clitopilus) prunulus*, edible; *A. (Lepiota) procerus*, edible; *A. (Clitocybe) dealbatus*, edible; *A. (Hypholoma) fascicularis*, not edible; *Polyporus sulphureus*, not edible; *Lycoperdon giganteum*, edible; *Bovista plumbea*, *Lycoperdon* (probably) *pyriforme*—all collected in Thorne's Park, Wakefield, end of November, 1875.—Mr. George Wilson exhibited a very fine series of *Diloba cæruleoecphala*. — Mr. Campbell exhibited the nest, eggs, and skeleton of the greater tit (*Parus major*) found in the centre of a large elm tree, which had been blown down by the late gale.—W. TALBOT, Secretary.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—The usual monthly meeting of this society was held Wednesday, Dec. 8th, Mr. H. R. Moiser, F.G.S., one of the vice-presidents, in the chair. The hon. secretary read the minutes of the last meeting, after which the chairman

exhibited and gave a description of a number of minerals, amongst them being marcasite, or white iron pyrites, which occurs sparingly in the chalk formation at Folkestone, and being susceptible of a high polish, and freedom from tarnishing, is manufactured into various ornaments, such as pins, ear-rings, brooches, &c., by the French and Swiss jewellers. A very large white variety, called the stone of the Incas, was made into mirrors and used by the ancient nobles of Peru : Magnetite, from Norway, which also occurs in our own country at Rosedale. This substance, when found in large masses, is used for natural loadstones : Chalybite or Spathie iron ore from Cornwall. This mineral is the valuable ingredient in the clay-iron ore of Cleveland, where it occurs combined with sand, clay, and various other carbonates, as brown earthy flattened nodules. Mr Wolstenholme, polished specimens of the onyx, jasper, and other agates ; Mr. Simmons, several very remarkable eggs of the common fowl ; Mr. Helstrip, a specimen of the Amazon parrot, which had lately died at the age of 100 years, also a fine specimen of *Acherontia Atropos*, bred from larva taken this year near Malton, and a box of Indian butterflies ; the secretary (Mr. Prest) the following lepidoptera :—a fine series of *Sphinx Convolvuli*, taken this year at Darlington by Mr. J. Law; *Agrotis, Obelisci* and *Lucerneae*, taken in Berwickshire by Mr. W. Shaw; *Noctua ditrapezium*, *Dasypolia Templi*, and *Xanthia Aurago*.

Diary.—Meetings of Societies.

- JAN. 5. Entomological Society of London. Leeds Naturalists' Club and Scientific Association : "Woodbury's Sciopticon as an Educational Instrument." with illustrations specially referring to Science and Art.—Washington Teasdale.
- ,, 8. Mirfield Naturalists' Society : Paper on "Spontaneous Generation."—Rev. W. Fowler.
- ,, 10. Huddersfield Naturalists' : Paper by Mr. G. T. Porritt, F.L.S.
- ,, 12. Leeds Naturalists' Club and Scientific Association : Exhibition of Specimens and Conversation.
- ,, 19. Leeds Naturalists' Club and Scientific Association : "Man and the Ice Age."—Thomas Tate.
- ,, 20. North Staffordshire Field Naturalists at Longton. Linnean Society of London.
- ,, 22. Huddersfield Naturalists' : "Corals."—Mr. Joseph French.
- ,, 24. Entomological Society of London. (Anniversary.)
- ,, 26. Leeds Naturalists' Club and Scientific Association, Converzazione in connection with the Leeds Mechanics' Institution.
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THE NATURALIST is published on the first of every month; Subscription, 4/- a year, post free, payable in advance.

N.B.—The Editors will be obliged if those gentlemen who have not already sent their Subscriptions, will be kind enough to do so; and any gentlemen desirous of subscribing should send their names without delay.

COMMUNICATIONS have been received from Stainland Naturalists' Society, Jno. Spurling, J. F. Beer, Thomas Armstrong, F.R.M.S., F. G. S. Rawson, &c.

EXCHANGE.

Mr. C. P. Hobkirk will feel obliged by any contribution of County or Local lists of Mosses for his projected work on "The Geographical Distribution of British Mosses."

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No. VII.

FEBRUARY, 1876.

VOL. I.

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HUDDERSFIELD:

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TO CORRESPONDENTS.

The Editors will esteem it a favor, if the Secretaries of Field Clubs and Naturalists' Societies throughout the Kingdom will favor them with occasional Notes of their proceedings and Excursions, when of interest.

Papers read at Meetings of these Societies, or otherwise, on any branch of Natural History, will be gladly received and inserted in full, if of sufficient general interest, or in abstract, if of only local interest.

All communications, except Advertisements, Exchanges, or Short Queries, should, if possible, be in the hands of the Editors not later than the 18th of the current month, to insure insertion in our next issue, and should be written on one side of the sheet only.

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Original Articles.

THE RAINFALL OF 1875.

BY JOSHUA W. ROBSON.

THE following is the return of rainfall during 1875, at Dalton, Huddersfield, collected in one of Negretti and Zambra's 8-inch Glaisher gauges (tested and certified as correct by Mr. Glaisher), the top of the gauge being 12 inches above the ground, and 350 feet above sea level :—

MONTH.	Total Depth.	Average, 1866-75.	Greatest Fall in 24 hours.		No. of days in which .01 or more fell.	Average, 1866-75.
	Inches.	Inches.	Depth.	Date.		
JANUARY	4·32	3·32	.54	18th.	23	18·5
FEBRUARY	1·47	2·59	.72	24th.	17	17·4
MARCH .....	.67	2·13	.12	6th.	13	15·5
APRIL .....	.94	2·06	.19	4th.	8	14·5
MAY	1·57	1·92	.31	18th.	14	12·2
JUNE	2·98	2·15	1·02	29th.	16	11·9
JULY	6·67	2·88	1·70	20th.	16	12·8
AUGUST	3·58	2·44	1·08	7th.	15	13·6
SEPTEMBER	3·65	3·48	.77	8th.	16	16·8
OCTOBER	4·80	3·48	1·05	20th.	19	19·2
NOVEMBER	4·26	2·90	1·13	13th.	20	15·5
DECEMBER	1·31	3·25	.60	21st.	14	17·8
Total ...	36·22	32·60			191	185·7

It will be seen from the above that the rain of 1875 has been in excess of the average by 3·62 inches, and that while the fall of the first half-year was less than usual by 2·23 inches, the second half was 5·84 above the average. As regards both the amount of rain and the number of wet days, 1866 and 1872 were much wetter years than 1875, the depth in 1866 having reached 45·11 inches in 216 days, and in 1872, 42·67 inches in 234 days.

Mr. Alfred Clay has kindly furnished me with the return from his gauge at Rastrick. His total for the year, in 203 days, is 35·59 inches. The average difference between our totals for nine years has been 1·17 inches, so that the variation is less than usual.

I have also been favoured with the year's return from Mr. D. Doncaster, Jun., of Broomhall Park, Sheffield. 35·60 inches is his

total, and his average for the last ten years has been 31.30 inches.

The selected returns published monthly in the "Meteorological Magazine" indicate that, when Mr. Symons presents us with his "British Rainfall for 1875," we may expect to find that the excess in the rainfall of this year of floods has taken place mostly in the midland and south-western counties of South Britain, and that at some of the wettest stations (Borrowdale and Portree, for instance) the weather has even been considerably drier than usual.

On six days during the year the rainfall has exceeded an inch. The heaviest day's rain was on July 20th—1.70 inches; and the heaviest shower fell between midnight July 17 and 8 o'clock July 18, when the gauge showed 1.30 inches as the result of the night's fall. 2.38 inches fell between the afternoon of October 18th and the noon of the 20th. Although 1.70 inches is a heavy day's fall, and is not often exceeded in this district, it sinks into insignificance when compared with the returns for July 20 from Newport, (Mon.) of 5.33, and Tintern Abbey 5.31 inches.

In conclusion, I subjoin a table showing the direction of the wind during the year. The most striking point about this is the great excess of east and north-east winds, which prevailed for 138 days, against an average of 106. In general terms it may be said that we have had during the year a month too much east wind and a month too little west. As often happens here, the heaviest rains have come with easterly winds; in each of the six instances already referred to, when the rainfall exceeded an inch, the wind was from the east.

DIRECTION OF THE WIND IN 1875.

Direction.	Days.	Average days per annum, 1866-75.
N.	14	13.5
N.E.	46	41.0
E.	92	65.1
S.E. ...	22	21.9
S.	15	13.1
S.W. ...	43	65.7
W.	114	118.8
N.W. ...	19	26.1

THE BIRDS OF WAKEFIELD :

With particulars of the occasional visits of Rare Species, and of those that have been observed to breed in the neighbourhood,

FROM 1845 TO THE PRESENT TIME.

BY WILLIAM TALBOT.

SYLVIADÆ.—(Continued).

It has often been reported that the Nightingale had been heard in the neighbourhood of Haw Park; although for 21 years I have never failed visiting the park in the night time, for entomological purposes during May and June, yet until the spring of 1873 I had not heard it there. On the 19th, 20th, and 21st of May I had the pleasure of seeing a pair, and for several hours each evening was charmed with the song of the male bird. They evidently intended breeding in the wood, but unfortunately their career was cut short by foul play.

In 1874 two others visited this neighbourhood, both of which I had the pleasure of listening to, for some hours on the 11th and 16th of May. In May, 1875, I heard three sing all within eight miles from Wakefield, one of them was unfortunately shot by a collier, who imagined that it must be equally attractive in plumage as it was charming in voice, but was previously disappointed when he obtained possession of it, and threw it away in disgust.

Mr. T. Lister, of Barnsley, the veteran naturalist, has kindly favoured me with his observations of the Nightingale. He is such a well-known authority on the subject, that I have much pleasure in appending his note :—

“ It is now fifty years since I first heard of a Nightingale being seen in the vicinity of Barnsley. I had not the good fortune to hear one myself until 1842, when I heard it at Edlington. The next I heard was in 1852, at Oscar Wood, and in the following year I heard one in Cobear Wood, Elsecar. Almost every spring since 1853 I have observed or heard of them in one or other of the following places :—Keresforth Wood; Kitroyd; Jump; Day House; Ethersley Wood; Needle Eye Wood; Dodworth Bottom; Sunny Bank; New Hall; Oscar; Dark Lane and Tivy Dale, at Cawthorne. Since

1863, with scarcely an exception, I have heard the Nightingale every year at New Park Spring or Houghton. As it may be interesting to know where they have recently appeared, I may mention that in 1871 I heard one at Houghton; in 1872, one at Norroyd and one at Keresforth; and in the present year (1873) I again heard one at Keresforth. Altogether I have heard thirty-one Nightingales in the neighbourhood of Barnsley since 1842."

BLACKCAP (*Curruca atricapilla*)—

This bird may be found breeding in any of the following localities:—Kirkthorp, Newmillerdam, Hawpark, and Bullcliffe wood; at the latter place is plentiful. It is a most delightful songster, and although it certainly has not the wonderful power of voice, nor the long runs in its song which the Nightingale possesses, yet its rich mellow tone makes it a great favourite with bird fanciers. My earliest date of its arrival is the 24th of April.

GARDEN WARBLER (*Curruca hortensis*)—

Is a songster which the Field Naturalist always listens to with pleasure, on account of its charming song. Judging from the depth of its notes, one might suppose it to have got swollen glands, yet its song is full of music, and gives one the impression that it proceeds from a much larger bird. It breeds plentifully in the neighbourhood. I have not noted its arrival earlier than the 26th of April.

WHITETHROAT (*Curruca cinerea*)—

Breeds very commonly in all the lanes in the neighbourhood. Its song, if it can be called one, is anything but pleasant to the ear, and is usually uttered whilst on the wing jerking up and down in the air. The earliest date I have noted this migrant is April 17th.

LESSER WHITETHROAT (*Curruca Sylviella*)—

Was always considered rare in this district until four or five years ago. I was often puzzled with the note of this bird until I found its nest containing eggs. It builds at Stanley, Kingswood, and in the low bushes surrounding Woolley Dam. I have not observed its arrival here before the 2nd of May.

WOOD WARBLER (*Sylvia sylvicola*)—

Is not uncommon in the woods round Wakefield. Its nest is built on the ground, and is very difficult to find. The 30th of April is my earliest note of its appearance.

WILLOW WARBLER (*Sylvia trochilus*)—

An abundant species. Arrives as early as the 9th of April.

CHIFFCHAFF (*Sylvia rufa*)—

The note of this bird strikingly resembles the spring note of the Great Tit (*Parus major*), and it requires a practised ear to detect the difference. Owing to this similarity of note, the arrival of the Chiffchaff is often chronicled before it actually puts in an appearance here. My earliest date of its arrival is the 2nd of April.

GOLDEN-CRESTED REGULUS (*Regulus cristatus*)—

On several occasions I have had the gratification of finding, in the neighbourhood of Hickleton, the beautiful nest of this little bird.

PARIDÆ.**GREAT TIT (*Parus major*)—**

Is common with us at all periods of the year. Its spring note very much resembles that of the Chiffchaff, for which it is often mistaken.

BLUE TIT (*Parus cæruleus*)—

Breeds plentifully in this locality. In the winter season it shows a decided partiality for feeding upon the larvæ of *Sesia tipuliformis*, which it easily extracts from the stems of the currant trees.

COLE TIT (*Parus ater*)—

Arrives here from the north in October, and leaves us in March.

MARSH TIT (*Parus palustris*)—

Breeds not uncommonly in the neighbourhood. Although it is a much smaller bird than the Blackcap (*Currucâ atricapilla*), yet it is often mistaken for it by casual observers, owing to its having a black patch of feathers upon its head.

LONGTAILED TIT (*Parus caudatus*)—

The nest of this bird is occasionally found in Haw Park, Bretton Park, King's Wood, and Bullcliffe Wood. In winter, large flocks may not unfrequently be seen in the above-named places.

AMPELIDÆ.

BOHEMIAN WAXWING (*Bombycilla garrula*)—

Three fine mature birds in full plumage were shot at Newmiller Dam in the winter of 1855 ; one of them is now in the collection of G. G. Janson, Esq., of Wakefield. Since the above date several others have been shot in the neighbourhood.

MOTACILLIDÆ.

PIED WAGTAIL (*Motacilla Yarrellii*)—

Breeds abundantly with us, and a few remain with us all the year round.

WHITE WAGTAIL (*Motacilla alba*)—

On March 25th, 1866, whilst collecting coleoptera from the willow stumps on the banks of the Calder, I noticed among a great number of pied wagtails, a pair which I thought must be the white wagtail. On my return home I communicated what I had seen to Mr. Parkin, and shortly after he favoured me with the following description of a bird he had shot in the identical place where I had seen the pair :—

“ The plumage agrees in every respect with the description given by Morris of *Motacilla alba* ; the sides of the head and forehead are white, whilst the crown is black, the sides of the neck are white, the nape is black in the upper part, the chin and throat are also black, but between them and the nape is a white space running into the grey of the back, which is very light ; the sides of the body are light grey, the breast is white, and the greater and lesser wing coverts are broadly margined with white. It is about the same size as the Pied Wagtail.”

I met with a second pair on Brierley Common, and on the ground, underneath a whin bush, I found the nest containing six eggs, which were *very slightly dusted* with a light grey upon a white ground.

GREY WAGTAIL (*Motacilla boarula*)—

Visits this district from September to March, when it leaves us for its breeding quarters. I have seen several specimens shot here in the middle of March, when they had got the full black patch on the throat.

RAY'S WAGTAIL (*Motacilla Rayi*)—

Breeds regularly in all this neighbourhood. The earliest date upon which I have observed the arrival of this migrant is on the 4th April.

/ ANTHIDÆ.

TREE PIPIT (*Anthus arboreus*)—

Breeds with us, and is moderately well distributed in this locality. The earliest period I have noticed its arrival here is the 9th April. This bird may easily be mistaken for the Meadow Pipit, but with the aid of a field-glass a careful observer will at once see that it is larger in size, and longer from bill to tail ; it is also of a lighter colour than the Meadow Pipit.

For a description of the eggs of this bird, which varies very much, see my notes in the *Naturalists' Recorder*, for April, 1873. Mr. Lister, of Barnsley, who has watched these birds, favours me with the following observations :

" During a morning walk by the Canal in Cliffwood, April 18th, 1853, I was greeted by the musical strains of the Willow Wren, a week later than last year, and soon after by the more loud and dashing notes of the Tree Pipit. The strains of the Meadow Pipit, our winter resident, were heard from the near fields in fine contrast to its kindred bird of the woods and trees.

(*To be continued*).

ON THE SEXUAL REPRODUCTION OF FERNS
AND MOSSES.—(*Concluded.*)

BY JAMES BAGNALL, BIRMINGHAM.

THIS continued upward and downward pressure on the tissue of the archegone causes it to become torn away at the base, the upper part of the archegonia, being carried upwards by the growing fruit rudiment, forms the *Calyptra*, the lower part is left surrounding the base of the rudiment, forming a sheath, and is termed the *Vaginula*. When the fruit-stalk has attained its full length, near the top a small opaque spot may be seen, this increases in size, until at length the capsule or fruit is formed ; within this, in due time, the spores are developed, and, when fully ripened, are dispersed by the falling away of the lid or operculum in some cases, or by the splitting of, or rotting away of the capsule in others.

I have not attempted to give a history of the development of the capsule and its spores ; I have slides illustrative of this matter in all its phases, and must let that part of the subject form some future paper.

This is an imperfect sketch of the normal development of mosses, but most, if not all the mosses appear to have the power of reproducing themselves by means of cellular bodies called gemmæ ; sometimes these occur in the axils of certain of the leaves, as in *Tetraphis* ; sometimes as in *Aulacommion*, at the top of an abortive seta ; and at other times, some of the marginal cells of a leaf will begin to protrude, and this protruded cell, by repeated cell divisions, lengthens out into a protonema-like body, as in *Orthotrichum Lyellii*, and other *Orthotrichæ*. In this neighbourhood *O. Lyellii* must be perpetuated by this means alone, as the plant never fruits with us. These buds, or gemmæ, on germinating give rise to a protonema similar to that formed by the spore. In some of the marsh *Hypna* I have seen plants formed from even the central cells of a leaf ; this is a case not unfrequent with *Hypnum giganteum*—in fact, in these plants nature has amply provided for their perpetuation.

In the commencement of my notes, I mentioned that there were analogies in the development of ferns and mosses ; these I hope I have made clear, but perhaps a brief recapitulation may not seem intrusive.

The structure of the *archegonium* of mosses is similar to that of ferns. In ferns it is that part of the prothallium in the interior of which “the embryo of the frond-bearing plant originates.” “In both large groups of higher cryptogams there is a cell which originates freely in the large central cell of the *archegonium*, by repeated division of which free cell, the fruit of the moss and the frond-bearing plant of the fern are produced.” In both cases, however, this free central cell remains unchanged, and the *archegonium* is no further developed unless at the time of the opening of the top of the *archegonium* spermatozoids find their way to it. It is necessary that these facts should be borne in mind, because unless we acknowledge the true sexuality of these plants (which is the fact I have been endeavouring to establish), we are not in a position to discuss this question of hybridization.

Hofmeister considers that the fruit of the moss is analogous to the fern plant with its fronds, and that the leafy stem of the moss is

analogous to the *Marchantia*-like prothallus of the fern, but I must refer those who desire to go more deeply into this matter to that wonderful work of his on "The Higher Cryptogamia."

Mosses like the flowering plants differ as to the nature of their inflorescence. In some species the *antheridia* and *archegonia* occur within the same involucrum or *perichaetium*. Such mosses are said to be synoicous, and may be considered as similar in the nature of their inflorescence to those flowers we term "hermaphrodite"; the term "synoicous" is a better term, being more expressive. In other species of mosses the *antheridia* occur in one bud, and the *archegonia* in another bud on the same plant—such mosses are said to be monoicous; whilst in others the *antheridia* and *archegonia* occur in separate buds on separate plants of the same species: they are then said to be dioicous.

I may seem to be going somewhat tediously into details in this matter, but I do so because it has been asserted in this Society that these *antheridia* are merely abortive *archegonia*; and a member has told me that he would one day bring me fruit from one of these organs. I am sure he never will. I fully believe in the true sexuality of both ferns and mosses, and am convinced that the *antheridia* are of as great importance as the *archegonia* for the production of fruit, but I should find it a difficult, if not an impossible task, to prove by demonstration that my belief is a true one, the difficulties surrounding such a case are so great; the minuteness of these different organs, the uncertainty of finding them at just the right moment, together with the fact that we have to dissect the plant and thereby destroy its vitality before we can begin our investigation, naturally renders the task of proof an almost impossible one. I have therefore only presumptive evidence—that of my experience in the production of fruit—to bring forward.

Now, I find that the synoicous and monoicous mosses are very plentiful, nearly every tuft of such mosses often bristling with fruit, but in dioicous mosses the fruit is rarely (in some cases never) found within a given district, or even within a given country; and I have made special investigations into the cause of this absence of fruit in certain of these mosses, and have invariably found that whenever fruit was absent in a locality, the plants there noticed were either wholly male or wholly female. This I have verified times without number, and therefore think I am justified in believing in the true sexuality of these plants.

I hope I have shown, then—though I fear in a very laboured manner—that to bring about fertilisation in these plants it is necessary that the spermatozoid of one cell should reach the germinal vesicle of another cell, however remote these cells may be. In monoicous mosses the distance those spermatozoids would have to travel to accomplish this, would be a relatively great one, but in dioicous mosses still greater. Any one who has looked at mosses will have noticed that they often grow in tangled tufts, several species often occurring together. In such mingled masses I can conceive it to be a not unlikely matter of frequent occurrence, for the antherozoid of one species to pass to the *archegonia* of another and distinct species; should these plants be nearly allied, fertilisation would probably ensue, and such fertilisation might result in the development of capsules bearing spores. These spores, on germinating, would naturally give rise to a number of hybrids; if the crossing was very near, such hybrids might be set down as a variety of one or other parent, and hence might occur not unfrequently, but fail to attract notice. If more attention was given to this subject than it now seems to have, I have no doubt that we should find that hybridity is a matter of more frequent occurrence than we may now think. We have satisfactory evidence that mosses do hybridise, Bayrhoffer having recorded the finding of hybrids between *Funaria hygrometrica* and *Physcomitrium pyriforme*, and between *Physcomitrium fasciculare* and *Funaria hygrometrica*, so that here even generic distinction was not a bar to perfect fertilisation.

If mosses are liable to hybridise, ferns, I think, are much more so; for although the *archegonia* and *antheridia* are usually developed on the same prothallus in these plants, they are only rarely ripe at the same time, so that the *archegonia* of one prothallus must be fertilised by the antherozoids of another prothallus. Hence we may consider that as a rule ferns are dioicous, and that cross fertilization is more frequent than self-fertilisation in these plants. The spores of these plants, both in nature and in cultivation, naturally get sown in mixed masses; these, on germinating, would give origin to a mixed mass of prothallia, and such a mixed growth would tend to bring about an intercrossing of species. In nearly allied forms this intercrossing would be fertile, and the progeny of such union would necessarily be hybrids. But why are they not more frequently found? Because only the few among the many fertilised archegones develope into fern plants, and even of those plants which are developed few ever get

beyond what I should call a seedling state—some wanting in stamina, and others failing to find in their surroundings the requisites for their continued existence. But in these plants we have also well-authenticated instances of hybridity. Martius records the finding of hybrids between *Gymnogramma chrysophylla* and *G. Calomelanos*, and between *G. chrysophylla* and *G. distans*. Braun also found a hybrid between *Aspidium filix-mas* and *A. spinulosa*, and I have no doubt that if we were to take the trouble we might any of us very much extend the list.

Our greatest investigators—such men as Braun, Hofmeister, and Sachs—are all firm believers in the sexuality of the higher cryptogams, and necessarily believers in the liability of these plants to hybridise. My own views on this matter were formed years ago, and before I had had the advantage of reading the works of these distinguished men. I may have formed erroneous opinions on this matter, but if I am wrong, I am at any rate wrong in very good company.

TRICHINA SPIRALIS:
OR
THE PORK WORM.

BY THOS. ARMSTRONG, F.R.M.S.

THE first record of the discovery of *Trichina spiralis* I believe to be by Dr. Tideman, in 1822. Professor Owen next described, in February, 1835, this human parasite. Mr. Hilton, of Guy's Hospital, and Mr. Wormald, of St. Bartholomew's, had occasionally noticed a peculiar speckled condition of the voluntary muscles of the human frame, but do not seem to have ascribed it to this cause. The case which afforded Professor Owen the opportunity of securing to this country the honour of the discovery, was also observed by another of our countrymen, Mr. Paget. Owen's view was, that the *Trichina* is merely the first stage of an animal destined for further development. Some of the first experiments to trace the origin of *Trichina* in man, were performed in Edinburgh by members of the Physiological Society; specimens of the parasite were shown to the Society in March, 1853, by Dr. Gairdner, who declared that its whole appearance was such as to strongly bear out Owen's theory. Gairdner thought it probable that the muscle was only the hotbed of the ova

which, for their development into perfect animals, required some other habitat: considering it to be not unlikely that the further development might take place in the intestinal canal of some carnivorous animal. He caused some of the specimens to be given to various dogs and cats; the result of these experiments was just as anticipated by Dr. Gairdner. When magnified, the white specks in the muscle are seen to be cysts of an oval shape, sufficiently transparent to show that they contain a minute coiled-up worm; on separating the muscular fibre, the cysts are found to adhere to the surrounding substance very strongly, so as often to render it difficult to detach them. They measure usually about $\frac{1}{50}$ th of an inch in length by $\frac{1}{100}$ th of an inch in breadth, and are generally in single rows parallel to the fibres of the muscle. If a thin section of the muscle is dried, and mounted as a microscopic object with Canada balsam in the ordinary way, the cysts become more transparent, and show the enclosed worm very plainly; a few of the cysts are seen to contain two, and occasionally three distinct worms. The body of the parasite is covered with a transparent skin, which seems to be almost, if not quite structureless; beneath this is a layer of fine granular matter, having the appearance of stripes and corpuscles: this is considered to be the muscular structure of the *Trichina*. The alimentary canal extends through the whole body from the narrow end, or head, to the extremity.

It is said by many that the organs of generation do not seem to exist in the encysted worm, but are developed when the *Trichina* attain their full development in the alimentary canal of their host. I believe the sex is frequently discoverable even when in the cyst. It was at one time supposed that *Trichina*, as found in the muscles, was the larva of another animal, but experience has shown that the fully-developed *Trichina* is a distinct species occupying the alimentary canal, giving birth to young *Trichina* which pierce the walls of the intestines, and on reaching the muscles, become capsulated.

In the pig, thousands of *Trichina* may exist without affecting the animal's health, though commonly at the period of migration from the alimentary canal to the muscular system, there is a lassitude and feverish state, which may be so severe as to kill, or may pass off, and either the animal lives on with *Trichina* in its flesh, which afterwards die, or in a short time there is evidence of pain and debility, followed by death. As many as from 50,000 to 80,000 *Trichina* have been found in a cubic inch of human muscle.

Cooking has little effect upon this parasitic flesh-worm. A portion of human muscle was boiled for five or six minutes, and upon breaking up the cysts, the worms appeared uninjured. I believe that until 1867 not a single case of *Trichiniasis* had been found in the living human subject in Great Britain, although twenty or thirty had been discovered at *post mortem* examinations. English pigs, although not quite, are very nearly, free from this parasite. The pig on the continent leads quite a different life to the English pig ; there they roam about and are allowed to eat any kind of offal, &c. Where there has been one case of *Trichiniasis* discovered in Great Britain, we may find hundreds recorded in Germany, and no doubt the different kind of life the pig usually leads here has a great deal to do with it. As a proof of this we find the Hampshire and Berkshire pigs, which are always kept enclosed in the yards of their breeders, are much more free from *Entozoa* than the Irish pigs, which are generally allowed to roam about at pleasure.

Professor Gamgee says :—“ Did Moses know more about pigs than we do ? Was it a knowledge of the parasitic diseases common to man and swine which led the father of the Jews to condemn pork as human food ? ” These are pertinent questions, and although we have reason to believe with Moses that the pig is an unclean beast, it is evident with care we can improve the race of swine, and thus not only prevent their own, but also human maladies.

Manchester, Dec., 1876.

Short Notes and Queries.

RARE BIRDS NEAR HALIFAX.—
In the last column of his work on British birds, the Rev. F. O. Morris in recording instances of Petrels taken in Yorkshire, mentions the fact of a Fork-tailed Petrel having been picked up in Halifax, on Dec. 16th, 1832, and also a Storm Petrel captured in the same town in Oct., 1846. As a specimen of the former was taken near Halifax, in Oct., 1847, and another Stormy Petrel was caught alive in Commercial

Road, on the 21st of last October, it appears that four specimens of these rare birds can be recorded for this district, not three as incorrectly stated at the November Meeting of the Ovenden Naturalists' Society. The following names of some of the rare species of birds taken in the neighbourhood of Halifax, within the past ten years, may be interesting to some of the readers of the “Naturalist.” Osprey, Honey Buzzard, Great Grey Shrike, Great Spotted Woodpecker, Quail, Oyster Catcher, Spoonbill, Whimbrel, Knot, Spotted Crane, Water Rail,

Smew, Great Crested Grebe, Sclavonian Grebe, Great Northern Diver, Red-throated Diver, Black-throated Diver, Manx Shearwater. To these could also be added a large number of other scarce varieties, including many sea as well as land birds, which have been taken in the Parish within the last few years, those named however occurring less frequently. In concluding these few notes it might be stated that there are at least 70 distinct varieties of birds which nest annually in the vicinity of Halifax; this indeed seems a large number, but taking into consideration the wide tracts of moorland, combined with the numerous valleys and woods in the district, the fact that so many birds resort to this neighbourhood is readily accounted for. F. G. S. RAWSON, Halifax, December 2nd, 1875.

RARE BIRDS NEAR BARNSLEY.—

Gallinago major, the great snipe, seen near Monk Bretton Abbey by J. Parker—very rare.

Anas boschus, wild duck, a flock of 26 seen by J. Parker flying W. by N. on September 2nd.

Saxicola Enanthe, wheatear—the last seen at Ingbirchworth, Sept. 13th.

Motacilla Rayi, Ray's wagtail, recorded at Woodhurst.

Rallus aquaticus, water rail. This scarce, partial migrant was killed by the telegraph wires near Wombwell, 16th September.

Sylvia rufa, chiffchaff, song last heard September 19th.

Sylvia trochilus, willow wren, song last heard 21st Sept.

Turdus iliacus, redwing, seen by W. Talbot of Wakefield, 9th Oct.

Ruticilla phoenicurus, redstart, seen by W. Talbot on October 19th, a late occurrence of this summer bird.

Caprimulgus Europaeus, night-jar, obtained in Jordan Hill Gardens 9th October, an unusual occurrence so late.

Larus argentatus, herring gull. Five of these occasional visitants recorded by J. Whitehead of Tyer's Hill, 26th October.

Alcedo ispida, kingfisher. Five of these beautiful but unfortunately rapidly decreasing birds were observed flying in a westerly direction from Dearne Valley by Mr. H. Garland, on 28th Oct.—THOS. LISTER, Barnsley.

Reports of Societies.

BRADFORD NATURALISTS' SOCIETY.—Meeting Jan. 11th., Mr. E. Margerison, president, in the chair.—The president's opening address was on the question "What is a Naturalist?" He divided naturalists into three classes, observers, describers, and collectors, each of which he treated at some length. The secretary read the report of the past session, which had only been a short one, but during the time the Society had made satisfactory progress. It now numbers 20 members, being an

increase of 10 members since its formation in August last. The formation of a library has been commenced, and during the session there have been exhibitions of specimens in botany, entomology, ornithology, and geology, and several papers on scientific subjects have been read at the meetings.

GOOLE SCIENTIFIC SOCIETY.—Meeting Jan. 12th.—A paper was read by the Rev. R. D. Maxwell, on “Science and Speculation,” in which the advantages, aims and methods of scientific research were eloquently set forth, and it was suggested that, if possible, a class should be formed in connexion with the Yorkshire College of Science.—H. FRANKLIN PARSONS, Sec.

HECKMONDWIKE NATURALISTS' SOCIETY.—On Saturday, the 15th January, the annual opening soiree of this Society was held, when upwards of 70 sat down to an excellent tea, T. B. Oldfield, Esq. president, in the chair. After the opening remarks of the president, the usual loyal toasts were given and responded to. The following Societies were represented by their respective presidents, viz:—Huddersfield, Barnsley, Holmfirth, Liversedge, Middlestown, and Bradford. The evening was very pleasantly spent, and enlivened by music, during the intervals of which many local toasts were given.—J. DEARDEN, Hon. Sec.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting January 10th,

the president, Mr. G. T. Porritt, F.L.S., in the chair. The chairman exhibited specimens of *Eupithecia dodoneata*, taken during the past season, he believed in the New Forest. Mr. Joseph Whitwam presented to the Society a nice collection of local conchological specimens, including many scarce species. Mr. George Liversedge presented various species of *Lepidoptera*. The president read an interesting paper entitled “An Entomological Visit to Kent,” which was listened to with great interest by the members present.
—GEORGE BROOK, Hon. Sec.

RASTRICK AND BRIGHOUSE NATURALISTS' SOCIETY.—Meeting 10th January, the president in the chair. There was a good attendance of members. Mr. W. M. Turner exhibited and named a number of plants, among which were the bay tree (*Laurus nobilis*), *Helleborus niger*, and a frond of *Polystichum angulare*. Mr. G. L. Lister exhibited a considerable number of rare and beautiful fossils from the Low Moor coal measures, including *Lepidodendron obovatum*, *Gyracanthus tubercularis*, *Ctenacanthus*, and a section eleven inches long of the vertebral column of *Labyrinthodon*. Mr. A. Firth also exhibited a splendid specimen of *Stigmaria*.—W. M. TURNER, Hon. Sec.

OVENDEN NATURALISTS' SOCIETY.—The tenth annual dinner of the above society took place at the Queen's Head Inn, Illingworth, on the last Saturday in December,

when upwards of 40 sat down to an excellent dinner, Mr. S. Baldwin, of Halifax, in the chair. The toast of the evening was proposed by Mr. Jonathan Mason in a very agreeable and pleasant style : he spoke of the advantages of the study of natural history. Mr. J. Spencer responded in a rather lengthy speech on the progress of geology. Mr. J. Ogden, the secretary, read the report, which showed the Society to be in a very prosperous condition, having 66 ordinary and 9 honorary members. The library contains 160 volumes. Mr. R. Earnshaw proposed the "West Riding Consolidated Naturalists' Society," and spoke of the advantages to be derived from attending their meetings.

STAINLAND NATURALISTS' SOCIETY.—The annual meeting was held at Barrwood, on the 6th Dec. The chief business was the election of officers for the ensuing year, viz :—J. E. Garside, president ; S. Calvert, vice-president ; W. H. Stott, Hon. Sec. Large flocks of fieldfares and larks were reported as having passed over Stainland on the 5th Dec., flying in a westerly direction.—W. H. STOTT, Sec.

WAKEFIELD NATURALISTS' SOCIETY. — The fifth annual meeting was held on the 16th Jan., when the officers for the ensuing year were elected as follows :—J. Wainwright, Esq., F.L.S., president, Messrs. A. Dickson and G. Campbell, vice-presidents, Mr. Thornton, treasurer, J. Spurling, corresponding secretary, &c. The

president afterwards exhibited some specimens of fossil wood and a calamite. Mr. J. Bradley presented the Society with "Owen's Lectures on the Comparative Anatomy of Invertebrate Animals." The Society has also received donations from the gentlemen patrons of the Society to the sum of £9 5s. for the purchase of a microscope for the use of the members of the Society.
—JOHN SPURLING, Hon. Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Meeting Jan. 12th.—Mr. H. R. Moiser, F.G.S., vice-president, in the chair. The secretary, on behalf of Mr. Humphries, exhibited a specimen of the Black Swan, which recently adorned our noble river, but was unfortunately killed during the late floods. Mr. C. Helstrip presented eggs of the Kite and Rough-legged Buzzard. Mr. Robinson exhibited a pair of the Grey Wagtail ; Mr. Wolstenholme a fine example of the Red-throated Diver, female, *Colymbus septentrionalis* ; also eggs of the Alpine Accentor, Hoopoe, White-bellied Swift, and Bohemian Waxwing ; the secretary, Mr. Prest, a fine series of *C. nupta* and *A. occulta* ; also *H. armigera*, *H. peltigera* and *X. petrificata*.

CORRECTIONS.

Page 81, No. VI.—The headline "FALCONIDÆ" should be "MERULIDÆ."

Page 79, No. V., third line from top—"fine olive green" should be "pale olive green."

Diary.—Meetings of Societies.

- Feb. 2. Entomological Society of London. Leeds Naturalists Club and Scientific Association: Paper on "Electricity."—Mr. Jas. Monckman.
,, 3. Linnæan Society of London.
,, 7. Huddersfield Naturalists' : Paper by Mr. W. Nettleton.
,, 8. Bradford Naturalists' Society.
,, 9. Goole Scientific Society : Paper, "The Galvanic Battery, and its uses."—Rev. J. Spink, B. Sc. Leeds Naturalists' Club and Scientific Association : Exhibition of Specimens.
,, 17. Linnæan Society of London. North Staffordshire Naturalists' Field Club, at Hanley.
,, 19. Huddersfield Naturalists' Society : Paper, "Chemical Botany."—Mr. A. Spiegel.
,, 22. Bradford Naturalists' Society.
,, 23. Leeds Naturalists' Club and Scientific Association : Annual General Meeting.—President's Valedictory Address.

THE NATURALIST is published on the first of every month; Subscription, 4/- a year, post free, payable in advance.

N.B.—The Editors will be obliged if those gentlemen who have not already sent their Subscriptions, will be kind enough to do so; and any gentlemen desirous of subscribing should send their names without delay.

COMMUNICATIONS have been received from Thomas Tate, Esq., A. Bennett, Esq., and others. We regret that Mr. Spurling's note is scarcely suitable for our pages.

EXCHANGE.

DESIDERATA.—Good specimens, with roots of *Gymnadenia albida*, Rich., *Listera cordata*, R. Br., *Epipactis atrorubens (ovalis)*, *Smilacina bifolia*, Desf., *Gagea lutea*, Ker., *Allium schænoprassum*, Linn., *Sparganium affine*, Schneiz., for specimens of *Teucrium Botrys*, *Galium Vaillanti*, *Obione pedunculata*, *Spartina alterniflora*, *Galium verum*, variety *ochroleucum*, *Lathyrus hirsutus*, *Juncus pygmæus*.—A. Bennett, 107, High Street, Croydon, Surrey.

DUPLOCATES.—*Ocellatus*, *Populi*, *Ligustri*, *Humuli*, *Lupulinus*, *Diminula*, *Salicis*, *Angularia*, *Sambucata*, *Thymiaria*, and many common species. DESIDERATA.—Eggs only of *Vespertaria apicaria*, *Alniaria*, *Tiliaria*, *Pinetaria*, *Boreata*, *Dilutata*, *Filigrammaria*, *Subciliata*, *Prunata*, *Dotata*, *Lota*, *Pistacina*.—Owen Wilson, Cwmffrwd, Carmarthen.

Mr. C. P. Hobkirk will feel obliged by any contribution of County or Local lists of Mosses for his projected work on "The Geographical Distribution of British Mosses."

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JOURNAL OF THE WEST RIDING CONSOLIDATED
NATURALISTS' SOCIETY,

AND

GENERAL FIELD CLUB RECORD.

NEW SERIES.

EDITED BY CHAS. P. HOBKIRK AND G. T. PORRITT, F.L.S.

No. VIII.

MARCH, 1876.

VOL. I.

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B. BROWN, MARKET PLACE CORNER.

TO CORRESPONDENTS

The Editors will esteem it a favor, if the Secretaries of Field Clubs and Naturalists' Societies throughout the Kingdom will favor them with occasional Notes of their proceedings and Excursions, when of interest.

Papers read at Meetings of these Societies, or otherwise, on any branch of Natural History, will be gladly received and inserted in full, if of sufficient general interest, or in abstract, if of only local interest.

All communications, except Advertisements, Exchanges, or Short Queries, should, if possible, be in the hands of the Editors not later than the 18th of the current month, to insure insertion in our next issue, and should be written on one side of the sheet only.

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Original Articles.

THE MARITIME PLANTS AND TIDAL RIVERS OF THE WEST RIDING.

By H. FRANKLIN PARSONS, M.D., GOOLE.

(Read before the Goole Scientific Society, November 10th, 1875.)

ALTHOUGH the West Riding of Yorkshire cannot boast of the possession of any sea-coast, yet nevertheless several sea-shore plants creep up the banks of the Humber estuary and of the great tidal rivers which join it, and gain a footing in our local flora. The names of those which I have observed are—*Spergularia marina*, var. *media*; *Apium graveolens*, *Aster Tripolium* and var. *discoideus*, *Glaux maritima*, *Samolus Valerandi*, *Plantago maritima*, *P. Coronopus*, *Rumex maritimus*, *Zannichellia pedicellata*, *Juncus Gerardi*, *Scirpus maritimus*, *Sclerochloa maritima*, *S. distans*.

The above-mentioned littoral plants, all of which are undoubtedly natives of this district, are, as one would have supposed, such as love muddy shores and brackish marshes rather than sandy or rocky coasts. Several of them, indeed,—as *Plantago Coronopus*, *Apium graveolens*, *Samolus Valerandi*, and *Sclerochloa distans*, are occasionally found inland, although even then generally in places so little elevated that a moderate depression of the land would bring it within reach of the sea. It would perhaps be more correct to call them “plants which prefer the neighbourhood of the sea,” than “sea plants.” Curiously enough, however, there are certain sea plants which re-appear inland at a certain height on mountains, e. g. *Armeria maritima*, *Cochlearia*, and *Silene maritima*. It has been supposed that these sea plants in alpine stations are relics of that great submersion of the surface which is known to have taken place during the glacial epoch, when beds containing shells of existing species were deposited on some of the Welsh mountains at a height of 1600 feet above the present sea level; and that, by some physiological peculiarities giving them an advantage in the struggle for existence over other lowland plants under alpine as well as under maritime conditions, they have been enabled to maintain their ground. The littoral plants found in the West Riding belong mostly to the British type of distribution—that is to say, they are such as are generally met with all round the coasts of Great Britain; one or two are of southern, but more of

eastern, northern, or western type. They do not comprise many rarities, *Rumex maritimus* being perhaps the least common. This plant, called sometimes the "golden dock," from the yellow hue which comes over it when the fruit is ripening, is found in ditches in the Marshland district, and as high up as Riccall.

The wild Michaelmas daisy, *Aster Tripolium*, is the most showy plant in my list ; its flowers, lilac in the ray, and yellow in the disk, may be found far on into the autumn—whence its name. A variety (*A. discoideus*) found at the Trent Fall, near Adlingfleet, is without the lilac ray. It attains its greatest luxuriance by the side of the warping drains, along the course of which it may be found up to the edge of the moors. I have seen plants four feet in height. On the Ouse I have not found it above Goole, but on the Don it reaches to Thorne.

The wild celery is common between Goole and the mouth of the Ouse ; it is found as high up as Wistow, above Selby, but is there perhaps escaped from a garden. The wild plant, though smaller, closely resembles the cultivated form, but is said to be poisonous, like the hemlock and others of the same order. The seeds, or rather fruits, contain in their substance minute reservoirs full of an essential oil which possesses the flavour of celery in an intense degree. Among the rations to be served out to our brave countrymen on the Arctic expedition I notice $\frac{1}{4}$ oz. of celery seed daily, I suppose because few substances contain a greater amount of flavour in so small a bulk.

Glaux maritima. This neat little plant is common on most parts of the coast, especially loving muddy estuaries, and, singularly, is also found in the inland salt districts of Worcestershire and Staffordshire. On the banks of the Avon at Bristol I have noticed it as being one of the highest reaching of the maritime plants, and here a few scattered plants may be found as high up as Howden Dyke on the Ouse, and above New Bridge on the Don.

The sea clubrush (*Scirpus maritimus*) is another species which extends far up the shores of tidal rivers, as on the Thames above London. Here it reaches, on the Ouse to Langrick, on the Aire to Newland, and on the Don above New Bridge.

As might be expected, sea plants become more and more abundant as we proceed down the river from Goole, until at the confluence of the Ouse and Trent the vegetation has quite a sea-side aspect. The increase, however, is due to the multiplication of individuals, not of species. On the banks of the Humber at Whitton and Brough there

are no kinds of maritime plants that are not to be found in the waste ground by the Hookroad at Goole, near the end of Marshfield Terrace, in which spot almost all the species that I have mentioned may be seen growing.

A characteristic feature of sea-side plants which becomes more and more marked as we proceed toward the mouth of the Ouse, is the succulence of the foliage ; this is a matter of habitat rather than of kind, for many plants which when growing inland have membranous leaves, become fleshy when growing on the sea shore. *Plantago maritima* and *Glaux maritima*, which at Goole are rank and weedy in habit, at the mouth of the Ouse near Ousefleet become dwarf and succulent. The succulence depends upon the amount of salt present in the soil ; if the water absorbed by the rootlets and carried up to the leaves be charged with salt, endosmosis is promoted, and evaporation is checked ; and hence the tissues of the plant are distended with fluid.

The common plants of the sea shore which are not found here, are perhaps worth a few remarks. Of course we do not expect to find on the banks of our muddy estuaries the plants of rocky or sandy shores, as the samphire, the horned poppy, and the sand sedge ; but it is strange that we do not get the sea-thrift (*Armeria maritima*) and the sea arrowgrass (*Triglochin maritimum*), for which I have looked carefully in vain, although one would have thought that our shores would have afforded them many a congenial home. None of the fleshy marine *Chenopodiaceæ*, *Salsola*, *Suaeda*, *Salicornia* &c., are found here, doubtless because there is not salt enough to please their taste ; but their landsman cousin *Atriplex hastata* near the Ouse mouth is very abundant and succulent, putting on a puzzling variety of forms.

Besides the flowering plants of maritime type which are truly native here, certain others worth mentioning are met with. On ballast at Goole, brought by sea-going vessels, I have found *Carduus tenuiflorus* and *Atriplex littoralis*, together with several plants which are not native in Britain ; these can take no higher rank in our local flora than that of casuals.

The well-known grass-like sea-weed, *Enteromorpha intestinalis*, is very abundant on stones in the Ouse ; it is, however, by no means exclusively a salt-water plant, as it is found plentifully in non-tidal ditches in the Marshland district, and indeed is sometimes met with far inland, and much above the sea-level. The variety which grows in the river is very different in appearance from that in the ditches, being dwarfer, more tufted, deeper green, and less inflated.

After very high tides I have sometimes found, washed up on the river banks, fragments of exclusively marine algæ, such as *Plocamium coccineum*, together with *Sertularia* and other marine zoophytes. A careful examination of the diatomaceæ which are plentiful on posts and stones in the river would no doubt bring to light many estuarine forms. Mr. Hunter has kindly furnished me with a short list of diatoms observed by him in the river Ouse at Goole, among which is one brackish water form, *Cymbella gastrooides*. Marine diatoms belonging to quite a different category may also be found—viz., those derived from Peruvian guano, and washed by the rain off the surface of cultivated fields: *i. e.*, *Actinocyclus Stephanodiscus*, and *A. empodiscus*.

On the marine fauna of our neighbourhood I am not in a position to say much. Of mammalia the bottle-nosed whale and other cetacea of the porpoise tribe occasionally come up the river, and do much injury to the fishermen. The seal appears to have been found in the Ouse in the time of the Danish colonization of England, for the name of Selby is translated by the monk who wrote the history of the Abbey in 1184, “*Vituli marini villa*”—the town of the sea-calf or seal.

Of birds, the common tern and several species of gull are very common with us.

Of fishes which live partly at least in the sea, the following are met with:—the salmon, the sturgeon, the flounder, the cucumber smelt, the sea eel, and the lamprey; the latter fetches a high price from the Dutch fishermen as a bait for cod.

Of the lower forms of animal life the waters of the Ouse appear remarkably destitute, partly owing to the rapidity of the tide, and partly to the muddiness of the water, which makes it difficult to see the forms which really may be present. I have never seen a mollusk of any kind in the Ouse, and crustacea are few. A number of the ciliated infusoria closely allied to *Vorticella*, but growing in colonies on a branched cartilaginous polypidom, is frequent on stones at extreme low-water mark.

With a view to learn how far the sea-water reaches up our rivers, I have made several experiments, the results of which are given in the annexed table. Of course the proportion of sea-water present at any given time in the river will depend on various circumstances, being greatest at high water, at spring tides, and in seasons of drought, when comparatively little fresh water comes down from above,

and little or none when the converse conditions obtain. On July 10th, 1874, a sample taken at the top of a high spring tide at Goole —the season being a very dry one—contained an amount of chloride of sodium corresponding to one part in five, of sea-water. A high spring tide being expected on Oct. 1st, 1875, I made arrangements for the collection of samples at high water, at the various piers and ferries in the neighbourhood. Unfortunately there had been hard rain a day or two before, so that the fresh water coming down from the hilly districts rather interfered with the experiment; nevertheless the table of the results obtained, on analysis of the samples, shows well the progressive diminution of chlorine and solids in solution from below upwards. (The slight increase at Goole over Swinefleet is probably due to the latter not having been taken exactly at high water.) The proportion of sea-water is calculated from the chlorine, by deducting the quantity (0·75 gr. per gall.) found at Selby—this being the same at low-water—and comparing the remainder with the amount found in sea-water. The larger quantity found in the Aire at Carlton is due, not to the sea-water, but to the sewage with which that much-abused river has been polluted, as the same quantity is found above Haddlesey Lock, where the tide does not reach. It appears that a certain proportion of salt reaches as far up the river as New Hay Ferry, near Hemingbrough; and I am told that at very high tides the water here tastes distinctly salt. At Selby, and for some little distance below, a moss—*Cinclidotus fontinaloides*—grows plentifully on the river bank, which proves that the sea-water does not reach so far as this, for no moss that I am aware of inhabits salt water.

There is yet another interesting constituent in the river water which it is believed has, at any rate in part, a marine origin: I allude to the “warp,” which plays so important a part in the agriculture of this neighbourhood. This warp is a fine sediment of a light brown colour, with a peculiar soft, silky feel to the fingers, and containing numerous glistening scales of mica. Mr. Hunter has kindly made for me an analysis of warp from the river Ouse at Goole, from which it will be seen that three-fourths of it consists of sand mica and other matters insoluble in acid, lime and magnesia together constitute about 6 per cent., and alumina rather more than an equal quantity. The composite nature of the warp well explains the character of the flora of this neighbourhood. There are four marked classes of soil, each of which yields to the botanist a peculiar flora,

viz., siliceous, calcareous, clayey, and peaty ; on the warp lands the vegetation partakes of the character both of limestone, of sandy, and of clayey soils.

The source whence the warp is derived has been a subject of debate, some maintaining that it comes down from above, others that it is washed up from below ; both views are probably partially right. All rivers carry down with them, especially in seasons of flood, a quantity of sand and mud, the detritus from the surface of their gathering grounds, which is deposited in the level part of their course near the sea, forming the mudbanks and shoals met with about the mouths of all their estuaries ; and this at first sight seems the most plausible explanation of the warp. There are, however, difficulties in the way of accepting it ; thus, the comparatively scanty sediment found in the rivers above the last locks has different physical characters to the warp found in the tidal portion of their course. Again, as we proceed upwards from Goole we find the warp gradually diminish ; in the tidal portion of the Wharfe there is hardly any. The last fact may perhaps be explained by the circumstance that the tide near its upper limit flows during a very small portion of the day ; the current running towards the sea during the remainder would tend to carry the sediment downwards into the lower reaches. On the other hand there are facts which show that, as far as Goole is concerned, the warp comes from below rather than from above ; thus it is most abundant, like the salt, in dry weather and at spring tides, and least so during floods, at neap tide, and at low water ; and, as I have before said, it diminishes as we proceed upward. Supposing it to come from below, there is an obvious source whence it may be derived, viz., the abrasion of the coast of Holderness—a coast which is being worn away by the sea so rapidly that a belt of land averaging a mile in width has been removed since the Norman conquest. Against this view it may be said that the warp reaches higher up the river than the salt does, but the warp being merely held in suspension, may be washed up a bit at a time by consecutive tides, the part deposited being carried a little higher and again partly deposited, and so on, while the salt being in solution would be washed out of it. The mica in the warp may be derived either from the micaceous sandstones of the carboniferous series, supposing it to come down from above, or from the granite boulders of the glacial clays of Holderness. The warp (represented in the table by solids in suspension) appears by my analysis to reach its maximum at Swinefleet, and to diminish thence

both upward and downward: but my observations are too few to found any theory upon, and I must leave the further discussion of the question to another occasion.

TABLE I.

Date.	Water taken at High Tide from		Miles from Sea.	Contents. Grs. per gallon.		Sea Salt.	Per-cent of Sea Water.
				Suspended Solids.	Dissolved Solids.		
Apr. '74	R. Ouse	Swinefleet	46 $\frac{1}{2}$	244	247	122·5	201·8
July, '74	"	Goole ...	49	*	540	280	461
"	Sea ...	Bridlington		†	2483	1410	2383
Oct. 1/75	R. Humber	Whitton ...	37	30	790	425	700
"	R. Ouse ...	Whitgift ...	43 $\frac{1}{2}$	88	297	148	242
"	"	Swinefleet	46 $\frac{1}{2}$	148	122	52	85·7
"	"	Goole ...	49	47	123	55	90·7
"	"	Booth Ferry	54	45	15	3	4·9
"	"	Langrick ...	57 $\frac{1}{2}$	27	15	1·75	2·9
"	"	Newhay ...	60	18	17	1·4	2·6
"	"	Selby ...	65 $\frac{1}{2}$	12	15	0·75	1·1
"	R. Don	Rawcliffe Br.	52	28	30	5·5	9
"	"	New Bridge	54	69	20	3	4·9
"	R. Aire	Carlton ...	63	7	15	2·2	3·7

* Not weighed.

† Trace.

TABLE II.

ANALYSIS OF WAKP FROM BANK OF RIVER OUSE, GOOLE. By E. Hunter.
(Dried at 160° C.)

Sand, &c., insoluble in H Cl. after 20' boiling	...	76·67
Magnesia	...	1·41
Lime	...	4·79
Chlorine	...	0·68
Oxide of Iron, and Alumina (latter about $\frac{2}{3}$)	...	9·17
Phosphoric Acid (P_2O_5)	...	0·09
Carbonic Acid	...	3·00
Sulphuric Acid (SO_3)	...	0·40
Organic matter (containing Nitrogen 0·168, Ammonia 0·204)	...	2·51
Potash, Soda, &c., not determined	...	1·38
		100·00

Microscopic examination showed mica abundant.

Three different forms of Sponge spicules.

Diatomaceæ.

Amphora hyalina.

Navicula Spencerii.

N. attenuata.

Melosira opercula.

M. nummuloides.

Cymbella gastroïdes.

Synedra capitata and three other forms.

Surirella (a very small form).

THE BIRDS OF WAKEFIELD :

With particulars of the occasional visits of Rare Species, and of those that have been observed to breed in the neighbourhood,

FROM 1845 TO THE PRESENT TIME.

—
BY WILLIAM TALBOT.
—

ANTHIDÆ.—(Continued).

“ It sings both in its ascending and descending flight, a habit which distinguishes it from the Tree Pipit, whose song begins at the top of its flight, continuing through the descent until near the ground or tree where it alights. I have never seen any variation, *when the song is uttered in flight*, for both will sing from a tree, or post, or the ground, and I am surprised not to find the distinction pointed out by any naturalist, the song during descent only being ascribed to both birds, or the distinction is passed over in silence by men whom I have hitherto followed with unquestioning deference, and have not hitherto published the discrepancy to avoid the appearance of a petty carping spirit. Both birds are about here indiscriminately called Tit Larks, but a well defined account of their song would have made the two species distinct to the learner. As with the three Summer Wrens where the outward similarity is so great, except in the minute point of claws and quills, the song would be the easiest mode of knowing them one from another. It is difficult to mark at a distance the long straight hind claw of the Meadow Pipit,

so as to distinguish it from the shorter arched one of the Tree Pipit. These remarks have been confirmed by me and many observers every season since the above date ; this very morning a Meadow Pipit rose singing from a field to a tree, sang while on the branch, then continued its song to the ground. I was curious to verify its singing on a tree, as the Tree Pipit more frequently does."

MEADOW PIPIT (*Anthus pratensis*)—

Breeds abundantly in this neighbourhood ; many of them staying with us through the winter.

ALAUDIDÆ.

SKYLARK (*Alauda arvensis*)—

Is very plentiful all the year round. I have seen its nest with eggs in, as early as the 7th April.

WOOD LARK (*Alauda arborea*)—

In the winter of 1856 Mr. Firth shot at a flock of skylarks which had settled in a seed-field at Wilbeck ; he killed several birds, and among them he found three wood larks, two of which he had preserved by Mr. Wright.

EMBERIZIDÆ.

SNOW BUNTING (*Plectrophanes nivalis*)—

Is an occasional winter visitor. I have a pair in my collection which were shot in January, 1857, in a field adjoining the Wakefield cattle market. Several killed in this neighbourhood since the above date, have passed through my hands.

BUNTING (*Emberiza miliaria*)—

Breeds regularly in this district ; as a rule it chooses to nest in mowing grass, and selects a place usually from ten to fifteen yards from the side of the field. I have in my possession two varieties of its eggs, pure white, found in a nest near my house.

BLACKHEADED BUNTING (*Emberiza schoeniclus*)—

May be seen on the banks of any of the streams ; I have frequently met with its nest, and when close upon hatching one may approach so near as to place his hand upon the bird before it takes to flight. As a general rule I have found that the male takes an important part in incubation.

YELLOW BUNTING (*Emberiza citrinella*)—

Breeds abundantly in this locality. I have found its nest containing eggs as early as the 19th of April, and have seen unfledged young ones as late as the 13th September.

FRINGILLIDÆ.

CHAFFINCH (*Fringilla cœlebs*)—

The beautiful nest of this pretty bird may be found in almost every lane and orchard around Wakefield. It is quite a favoured visitor at the cottage door in winter time.

MOUNTAIN FINCH (*Fringilla montifringilla*)—

This migrant never fails to honour us with its presence in winter time; in the years 1867 and 1871 a larger number than usual visited this neighbourhood, and they might be seen feeding in seed-fields and farm-yards in company with chaffinches, yellow buntings and linnets. I have found it to be a very difficult matter to keep this bird in a healthy state when in confinement, and it is not at all sociable with other feathered friends. My earliest note of its arrival is the 28th September, and the latest departure the 21st of May. I have observed that it wears a much prettier dress in the month of May than it does in the winter.

TREE SPARROW (*Passer montanus*)—

Is found in great numbers in the railway cutting and stone quarries of Horbury, where it breeds quite freely. The eggs vary very much in colour and shape.

HOUSE SPARROW (*Passer domesticus*)—

Breeds very abundantly in Wakefield, particularly near the large corn warehouses at the side of the Calder. I am told by corn porters that the quantity of larvæ of the corn weevil which they eat is most astonishing. The popular prejudice against this bird is intense, and, like many other prejudices, it has only a slender foundation to rest upon.

GREENFINCH (*Coccothraustes chloris*)—

Breeds abundantly in this locality, greatly to the annoyance of market gardeners, who tell me it is one of the most destructive birds with which they have to contend, as it plays great havoc among the newly-sown beds in springtime. From my own

observations of its predatory habits I believe the complaint to be well-founded. It is a very quarrelsome bird when placed in confinement with other species.

HAWFINCH (*Coccothraustes vulgaris*)—

The nest of this bird has twice been found in this district. I have in my possession two eggs which I took from a nest in an orchard at Hickleton, on the 17th June, 1853. Mr. Dickson, of Thornes, has two young birds, taken last July at Bretton. On several occasions in previous years he has had not only the birds but the nests and eggs described to him by persons resident at Woolley and Bretton, and he is consequently of opinion that they breed regularly in those places. On the 19th December, 1874, Mr. Wainwright, of Horbury, caught a hawfinch in a snare which had been set for the capture of redwings; and on the 17th January, 1875, two were shot near Woolley.

GOLDFINCH (*Carduelis elegans*)—

This pretty bird breeds sparingly in this district, although in winter they are plentiful, and may be readily met with on the railway and canal embankments, where the bird-fanciers find no difficulty in capturing them. I have found its nest at Nostell, Bilham, Hickleton, and Woolley.

SISKIN (*Carduelus spinus*)—

Is an occasional visitor. On the 17th January, 1872, a female was brought to me which had been killed in Park-lane, by a boy with a catapult. On the 5th December, 1875, I had the opportunity of watching three searching for food among the ash and alder trees in Lupset Park, putting themselves, like little mountebanks, through all kinds of grotesque postures.

LINNET (*Linota cannabina*)—

I have found breeding in the gorse at Heath Common, Sharlston and Ryhill. I have two perfectly white eggs found at the latter place.

LESSER REDPOLE (*Linota linaria*)—

Breeds plentifully about Wakefield. When in confinement it can easily be taught to do several little tricks.

MOUNTAIN LINNET (*Linota montium*)—

In December, 1856, I visited a friend at Netherton Farm, and he showed me a number of small birds he had shot in the stack

yard, among which I found six mountain linnets. Since that time I have seen several which had been caught in this neighbourhood in the winter months.

BULLFINCH (*Pyrrhula vulgaris*)—

The nest of this bird may be met with every season at Nostell, Hemsworth, and New Park Spring, and occasionally at Royston, Woolley, and Bretton. In winter I often meet with it in the orchards near the town.

CROSSBILL (*Loxia curvirostra*)—

During the winters of 1850–1–2, I frequently saw the crossbill in Brodsworth Wood, and I was much interested in witnessing the dexterous manner in which it could split open, and extract the seed from the fir cones. Since that time I have had upwards of a dozen birds sent to me to preserve. I have met with it at Nostell, and I have been informed that two have been shot at Newmillerdam. The dissimilarity in its plumage is very remarkable, there being seldom two found alike.

(*To be continued.*)

Short Notes and Queries.

HABITS OF THE GOOSANDER.—On going to the Zoological Gardens I observed one of the Goosanders with its neck shortened and greatly bulged out on the left side. I was aware that the *œsophagus* was dilatable, and I have no doubt it had swallowed a large fish, and because it was “crop-bound,” or for some other reason it would not at once pass. This species has been known to swallow a fish, tail first, which I take to be a curious circumstance, for generally it is the other way. A fish may occasionally be found on opening its gizzard all perfect at the caudal end, yet with its head digested. A writer in the *Zoologist* gives us some particulars

of the life of a blind shag which would never swallow a fish or even a strip of fish against the scales.—

J. H. GURNEY, Jun.

Northrepps Hall, Norwich.

SABINE'S GULL AT FLAMBOROUGH HEAD.—As your columns are open to the occurrences of rare birds in Yorkshire, allow me to record a very rare one in my collection. It is an immature Sabine's Gull, and was shot on the 15th of October, 1873, by a correspondent of mine, near the Smithwick Buoy, some three miles south of Flamborough Head. It is singular that there should be no work on the birds of such a large and important county as Yorkshire—a county where so many varieties have been obtained. Almost every county possesses its

Avifauna, and if anyone would do for Yorkshire what Mr. Stevenson has done for Norfolk, it would be a boon to naturalists.—J. H. GURNEY, Jun.

January 27th, 1876.

THE WHITE WAGTAIL AND THE PIED WAGTAIL—The white wagtail and the pied wagtail are so much alike, that it is not much wonder if people often confound one with the other. For your correspondent's information let me mention what I consider the best point of distinction : It is the colour of the lower part of the back which is invariably grey in the white wagtail, and black, or nearly black, in the pied species. Many people suppose that every grey-backed wagtail is a white wagtail, but unless the rump is also grey, it is not so.—J. H. GURNEY, Jun.

EARLY SPECIMEN OF "PIERIS RAPÆ."—This morning, Mr. J. R. Dore brought me a fresh lively specimen of this species he had taken in his garden at Fartown. It is surprising the species should be out so early, especially as it was taken during the severest frost we have had this winter.—GEO. T. PORRITT.

Huddersfield, Feb. 14, 1876.

THE RAINFALL OF JANUARY.—1876 has opened with the driest January we have had for some years, the rainfall being only 0·95 as against an average for the ten years 1866-75 of 3·33 in. The rainy days have been 11, the ten years' average being 18·5. On six of these eleven days the rain fell in

the form of snow. The heaviest fall was 0·23 in. on the 20th. The month has been colder than usual, with more than the average of easterly and north-easterly winds.

—J. W. ROBSON.

Dalton, 18th Feb., 1876.

Reports of Societies.

BRADFORD NATURALISTS' SOCIETY. Meeting January, the president, Mr. E. Margerison, in the chair, who gave an historical and amusing reading on "The Great Snakes of Asia, Africa, and America," particularly naming the boa, python, cobra, asp, and rattlesnake, and gave some amusing anecdotes of each.—Mr. R. Spencer exhibited specimens of kestrel, mounted in the attitude of devouring its prey, and other ornithological specimens; Mr. J. Whiteley a living specimen (bred) of the *Hadena pisi* remarkable for having come out of the chrysalis three months before the usual time.

MEETING Feb. 8th, the president in the chair.—Mr. J. W. Carter read an article from Newman's Entomologist on "Injury to linen in the bleachfields by larvae of *Arctia rubiginosa*," and exhibited both the larva and moth. Mr. R. Beaumont exhibited a good specimen of the red-legged partridge; Mr. R. Spencer, fieldfare and blue titmouse; and the following moths by Mr. J. W. Carter :—*Carsia imbulata*, *Eupithecia venosata*, *E. centaureata*, *Ennomos Ziliaria*; Mr. J. W. W. Brook (dried) specimens of *Impatiens noli-me-tangere*, *Parnassia*,

Drosera rotundifolia, *Alchemilla alpina*, *Primula farinosa*, *Oxyria reniformis*; and Mr. T. Hargreaves *Polystichum aculeatum*, &c.—J. W. BROOK, Hon. Sec.

GOOLE SCIENTIFIC SOCIETY.—Meeting Feb. 16th.—A lecture was given by the Rev. J. Spink, B. Sc., on “The Galvanic Battery and its uses,” illustrated by a number of interesting experiments. It was unanimously agreed that the Society should join the West Riding Consolidated Naturalists’ Society.—H. FRANKLIN PARSONS, M.D., Hon. Sec.

HECKMONDWIKE NATURALISTS’ SOCIETY.—Meeting 5th February, T. B. Oldfield, Esq., president, in the chair.—Two papers were read, one on the formation of the coal strata, the other on a submerged forest near Holmfirth. A number of fossils, comprising scales of one of the ganoid fishes of the carboniferous period, leaves of the *Sphenopteris latifolia* and *Pecopteris*, and stems of the *Sigillaria reniformis*, *Lepidodendron elegans*, &c., were exhibited by Mr. J. M. Barber. Mr. J. L. Adamson reported a woodpecker having been shot at Gomersal.—J. DEARDEN, Sec.

HUDDERSFIELD NATURALISTS’ SOCIETY.—Meeting January 22nd, the president, Mr. G. T. Porritt, F.L.S., in the chair.—Various early flowering plants were laid on the table, and named by Mr. Allen Godward, amongst them *Mercurialis perennis* in bloom. The president exhibited the following rare lepidoptera he had recently added to

his collection:—*Deiliphila lineata*, bred by Mr. C. Rickard in 1873, from a larva found by him at Plymouth; the specimen of *Deiopeia pulchella*, taken at Plympton, in Devonshire, on the 2nd of October last, and recorded in the *Entomologist* of the month following; also an example of *Leucania albipuncta*, taken by Mr. William Purday, at Folkestone, in July last. A discussion took place on the contents of a letter which had appeared in the *Standard* a week previously as to the effect of aquatic vegetation on the pollution or purifying of rivers, the opinion of all the speakers being opposed to that of the author of the letter in question. A paper on “Corals” was then read by Mr. Joseph French, who in a very clear and interesting manner gave a history of the various species of these creatures, and the manner in which the three kinds of coral reefs are formed. At its close a lively discussion ensued amongst the members, and ultimately it was agreed to adjourn the continuation of the debate until the meeting of the 19th February.

MEETING Feb. 7th, the president in the chair.—The geological specimens exhibited included a beautiful example of *Bothrodendron punctatum*, from Bradley, by Mr. Elisha Seddon; and a specimen of saccharoid carbonate of lime sent from the Thornhill collieries, by Mr. C. T. Walker. Mr. Lister Peace exhibited *Limax flavus* and *Zonites radiatus*, collected in the district. A discussion then took place on the part of Holmfirth recently visited

by the Manchester Geological Society, the members of which had come to the conclusion that the tract contained a submerged forest. As some members of the Huddersfield Society were convinced those of the Manchester Society were in error, it was decided that the Society make an excursion and investigate the matter on Saturday, the 19th February. A very interesting lecture on "The Physical Geography of Huddersfield and District," was then delivered by Mr. William Nettleton, which elicited a very lively discussion.—GEORGE BROOK, ter. Hon. Sec.

LIVERSEDGE NATURALISTS' SOCIETY.—The First Annual Meeting was held in the Millbridge National School-room, on Saturday, January 29th, 1876.—The Rev. William Fowler, M.A., president in the chair, supported by Dr. Oldfield, Heckmondwike ; Mr. Joseph Tindall, Huddersfield ; Mr. Margerison, Bradford ; Mr. Kaye, Mirfield ; and Mr. J. M. Barber, Heckmondwike. Letters of apology for unavoidable absence were read from Alderman Wainwright, F.L.S., of Wakefield, and others. The annual report shewed that the Society was founded on September 14th, 1872, with twelve members ; it now numbers forty-five. As to its financial position, the committee are happy to say that there is a steady increase in the funds and property, such as books, &c., and there is a credit balance of £3 19s. 11d. The weekly meetings are for the study of botany, geology, &c., the monthly meetings on the first

Tuesday in each month, for the exhibition of specimens. The Library contains 91 volumes of standard works of reference.—JAS. ROTHERY, Secretary.

OVENDEN NATURALISTS' SOCIETY.

—Meeting at Illingworth, Mr. T. Robertshaw, president, in the chair. Mr. C. Sheard exhibited in bloom *Chrysosplenium oppositifolium*, *Mercurialis perennis*; Messrs. T. Cockroft and Crowther exhibited geological specimens, which were named by Mr. J. Spencer, and were as follows :—*Dadoxylon*, with its leaf scar (commonly called *Uloden-dron*) broken off in such a way as to show the manner in which it was attached and connected with the internal structure of the plant ; *Cardiocarpus*, or fossil fruit-stones, from Ringby quarries ; *Goniatites Listeri*, and *Orthoceras cinctum*, from Shibden Head pit ; *Sigillaria Sternbergii*, from Netherton railway cutting ; and cone-in-cone from Windy Bank pit. Mr. T. Hirst exhibited a badger which had been taken near Keighley, and also a number of birds and birds' skins which had been sent from New Zealand, by Mr. S. Garforth, to his father, Mr. John Garforth, of Stack Field, Ovenden ; they were, shining cuckoo, eared grebe, apteryx, *Platycerus novae-zealandiae*, crimson top paroquet, parson bird, thrush, swamphen, a pair of *Stringopo habroptilus* or rakapos. Mr. Garforth has presented to the Halifax Museum one *Stringopo habrop-tilus* and one apterpx, which will be valuable additions to the collection of birds.

RASTRICK AND BRIGHOUSE NATURALISTS' SOCIETY.—Meeting 14th February, the president in the chair.—Specimens of *Mercurialis perennis*, *Potentilla Fragariastrum*, and *Corylus Avellana*, were exhibited in bloom. Mr. G. L. Lister exhibited a fine specimen of *Ulodendron*, from the middle, and of *Acanthodes* from the lower, coal measures. Mr. W. Kaye exhibited *Perdix cinerea*. —W. M. TURNER, Hon. Sec.

SELBY NATURALISTS' SOCIETY.—Meeting 11th February, at the Mechanics' Institute, Mr. J. T. Atkinson in the chair.—Dr Parsons attended the meeting, and threw out some good suggestions in reference to the formation of the Society. The following officers were then appointed :—president, Mr. J. T. Atkinson; secretaries, Mr. Cheesman and Mr. V. Taylor; committee, Dr. Parsons, Mr. Foster, Mr. Bell, and the Rev. G. D. Wyatt. There is every prospect of the Society being a successful one, several papers having been already promised.

STAINLAND NATURALISTS' SOCIETY.—Meeting at Barwood, on the 7th February.—Mr. J. E. Garside exhibited a fine male specimen of the Merlin hawk, Mr. W. H. Stott corn-crake, dipper, and goldfinch; C. C. Hanson, robin, bramble finch, and warty-faced honey-eater, from Australia; also eggs of hedge-sparrow, swallow, and pied wagtail. A conversation on the sagacity of animals and birds concluded a very interesting meeting.—Vast

flocks of fieldfares were seen in the neighbourhood on the 9th inst.—CAIUS CASSIUS HANSON.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly meeting, February 3rd. Mr. A. Dickson, vice-president, in the chair.—Mr. Hall exhibited a quantity of birds' eggs, amongst which we noticed the oystercatcher, blackheaded gull, Brunnick's guillemot, bridled guillemot, with three varieties of the common guillemot, razor bill, herring gull, lesser black-backed gull and coot. Mr. Walsham exhibited two tusks, supposed to be from the walrus.—JOHN SPURLING, Hon. Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting held February 9th, at the house of Mr. Prest, Holgate-road, Mr. H. R. Moiser, F.G.S., in the chair.—Mr. Webster exhibited a number of dried plants; Mr. C. D. Wolstenholme, eggs of the cirl bunting, *Emberiza cirlus*; the ortolan bunting, *E. hortulana*; the snow bunting, *Plectrophanes nivalis*; and the Lapland bunting, *P. Lapponica*; Mr. Robinson, a fine pair of the black-tailed godwit, *Limosa ægoccephala*; Mr. Helstrip, two skins of the adjutant bird, from India. The chairman read a paper on "Distribution of Gold," after which Mr. C. D. Wolstenholme read a very interesting paper on the "Abnormal Habits and Conditions of Birds," and exhibited on behalf of Mr. Morgan a specimen of an albino redwing, *Turdus iliacus*.

Diary.—Meetings of Societies.

- Mar. 1. Entomological Society of London. Holmfirth Naturalists'
" 2. Linnean Society of London. Wakefield Naturalists'.
" 3. Clayton West, Heckmondwike, Honley, and Mirfield
Naturalists'.
" 6. Huddersfield Naturalists' Society : Paper, "Conchological
Rambles."—Joseph Whitwam. Barnsley,
Stainland, and Todmorden Naturalists'.
" 7. Bradford Naturalists' Society : Paper, "The generation
of Animals."—E. Margerison. Liversedge
Naturalists'.
" 8. Goole Scientific Society : Paper, "The Heart and
Circulation."—Jas. Savage, M.R.C.S.
" 11. Middleston, Paddock, and Ripponden Naturalists'.
" 13. Rastrick Naturalists'.
" 16. Linnean Society of London. North Staffordshire
Naturalists' (Annual), at Stoke.
" 18. Huddersfield Naturalists' Society : Paper, "Metamor-
phosis of Insects."—Geo. Brook. Honley
Naturalists'.
" 21. Bradford Naturalists' Society : Paper, "Conchology."—
E. Margerison.
" 25. Ovenden and Paddock Naturalists'.

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N.B.—The Editors will be obliged if those gentlemen who have
not already sent their Subscriptions, will be kind enough to do
so ; and any gentlemen desirous of subscribing should send their
names without delay.

COMMUNICATIONS have been received from W. H. Pearson,
C. P. Hobkirk, North Staffordshire Naturalists' Field Club, &c.

EXCHANGE.

DESIDERATA.—Good specimens, with roots of *Gymnadenia albida*,
Rich., *Listera cordata*, R. Br., *Epipactis atrorubens (ovalis)*, *Smi-*
lacina bifolia, Desf., *Gagea lutea*, Ker., *Allium schænoprasum*,
Linn., *Sparganium affine*, Schneiz., for specimens of *Teucrium*
Botrys, *Galium Vaillanti*, *Obione pedunculata*, *Spartina alterniflora*,
Galium verum, variety *ochroleucum*, *Lathyrus hirsutus*, *Juncus*
pygmaeus.—A. Bennett, 107, High Street, Croydon, Surrey.

DUPLOCATES.—*S. populi*, *Ligustri*, *Humuli*, *Salicis*, *Ulmata*, *Cer-*
vinaria, &c. DESIDERATA.—Eggs of many species ; also larvæ
of *Egeria*, *Megœra*, *Osseata*, *Conigera*, *Turca*, *Rurea*, *Palens*,
Furoa, *Baselinea*.—Owen Wilson, Cwmffrwd, Carmarthen.

WANTED.—Eggs or larvæ only of *N. hispidaria*, *H. rupicapraria*,
P. nubeculosa, *A. pictaria*, *N. conflua*, *N. Dahlii*, *N. sobrina*, *N.*
neglecta, *T. piniperda*, *T. leucographa*, *T. populeti*, *T. gracilis*, *T.*
munda, *C. vetusta*, *X. semibrunnea*, and *X. petrificata*.—Owen
Wilson, Cwmffrwd, Carmarthen.

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No. IX.

APRIL, 1876.

VOL. I.

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TO CORRESPONDENTS.

The Editors will esteem it a favor, if the Secretaries of Field Clubs and Naturalists' Societies throughout the Kingdom will favor them with occasional Notes of their proceedings and Excursions, when of interest.

Papers read at Meetings of these Societies, or otherwise, on any branch of Natural History, will be gladly received and inserted in full, if of sufficient general interest, or in abstract, if of only local interest.

All communications, except Advertisements, Exchanges, or Short Queries, should, if possible, be in the hands of the Editors not later than the 18th of the current month, to insure insertion in our next issue, and should be written on one side of the sheet only.

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Original Articles.

THE ORGANIZATION OF *DAPHNIA PULEX*. (1)

By THOMAS TATE, OF BRADFORD, YORKS.

THE "water fleas" are sufficiently abundant to ensure their being neglected by the bulk of observers. We are apt to prize and study most what is rare, though the patient investigation of a common form and its affinities may often result in more substantial gain. If the reader can imagine a shrimp suspended by the head within the two valves of a mussel shell, both—shrimp and shell—being as transparent as glass, and of almost microscopic minuteness, he will have a rough notion of the animal whose organization is the subject of this paper. For the *Daphnias* belong to the Entomostracous group of Crustaceans : *entomostracon* meaning "an insect within a shell." If you hold one up to the light you will see a dark speck on the forehead—its eye—and a dark streak lengthwise, and curving under—the digestive track. Produced from each side of the head you will note a powerful branched or arborescent organ, waving to and fro incessantly. These are its large inferior antennæ, or arms, by which the animal propels itself through the water in short and sudden bounds. Hence its vulgar name, "branched horned water flea," distinguishing it from the "four-horned water flea" (*Cyclops*). This minute crustacean is to be met with in fresh-water ponds and ditches, most abundantly in situations where the water is renewed from time to time by an overflowing stream. Its office in the economy of nature is that of a scavenger; rapidly devouring, as it does, the vegetable and animal particles floating around. It appears healthy in captivity, but diminishes in size.

Examined under a low power, one cannot fail to admire its delicacy of structure, and the high vitality which it manifests. The seeming complexity of its organization will disappear if we remember that the two ends of its body are bent under the main trunk. The anterior extremity is curved downwards and backwards, the posterior downwards and forwards. The chitinous exoskeleton is faintly

N. S., VOL. I.—APRIL, 1876.

(1) Read before the Leeds Naturalists' Field Club and Scientific Association,
Jan. 26, 1875.

annulose, consisting of eight segments. The first, or cephalic, segment, is the largest and most important, lodging the masticatory organs, gullet, stomach, liver, brain and eye. It is homologous with the first seven somites of a typical crustacean fused into one; the bivalved carapace being an enormous expansion of the three mandibular somites. This development of the cephalic somites is, we shall find, accompanied by a consolidation of its nervous system, in harmony with the law governing all crustacea, in which a separation of the nervous cord into distinct ganglia is coincident with a corresponding decrease in the importance of the carapace. Suspended from the second (thoracic) and the four succeeding segments are five pairs of jointed feet, the middle three of which carry branchial plates, furnished with long plumose setæ or bristles. Along the ventral aspect of the same segment, runs a depression or gutter into which the particles of matter, drawn within the shell by the incessant movements of the feet, are directed by the first pair, the rejected material being extruded by the last pair. The masticatory organs consist of a pair of toothed jaws, and a labrum. The latter lies horizontally parallel with the mouth, to which, part of its base is attached. It works vertically, between the two rows of feet. Its free extremity is expanded into a fleshy contractile palpiform process studded with short hairs. When in use it extends beyond the ventral edges of the carapace or shell. The first and second maxillæ are fused with the long narrow mandible, terminating in a surface not unlike that of an elephant's tooth, and are suspended vertically from before the first articulation, having a lateral semi-rotatory movement.

The food particles drawn forward by the labrum are seized by the jaws and passed to the mouth, which lies immediately in front thereof, and leads into a short narrow æsophagus that curves forward and upward, opening into the stomach just behind the brain. While the food is undergoing the process of digestion it is slowly passed backwards and forwards by the alternate dilatation and contraction of the muscular walls of the stomach. From each side, near the anterior orifice of the stomach arises a cœcal appendage, in shape like an S inverted. The free end is closed, the other occasionally pours a colourless fluid into the stomach when food is lodged therein. When in use a transverse contraction, synchronous with the pulsation of the heart, is visible near the bend of the organ; and at times portions of food may be seen to have a swaying movement within, similar to what is observable in the stomach. But these movements in the cœcals

and the stomach do not go on together, nor do the two cæca act at one time. When one is active the other is passive, and for the most part both are quiescent. This curious pair of blind sacs reminds us of the similarly located coronet of cæca in *Orthoptera* and *Hemiptera*, usually regarded as analagous to the liver of higher animals; but the fact that the former afford lodgment for particles of food while the latter never do, forbids any further inference. Still less are they to be interpreted as the homologues of the two cæca in *Brachyura*, or the single cæcum in *Macrura*, the rudiment of the yolk-sac of the embryo, these being connected with the opposite end of the stomach. That they are lateral diverticula of the stomach, and its functional allies, is clear. The adaptation for food already partly assimilated (animal) which the straight course of the digestive track indicates (while a vegetable diet is more or less constant) must not be lost sight of in any attempt to decipher these unique organs. The homologues of the hepatic organs of higher crustacea must be sought for, not in these but in the similarly situated glandular masses overlying the pyloric extremity of the stomach. The stomach itself is of uniform diameter throughout, and extends in a straight course backwards, as far as the fifth or sixth segment, when it gives place to the rectum. The latter is continuous with the stomach, but bends downwards, its termination being closed by a powerful muscular sphincter. Beyond this is a cloacal cavity ending in an anus between two toothed arches on the dorsal aspect of the telson. This caudal plate is triangular, flattened, and tipped with two powerful horny hooks, with which the animal cleanses and guards the entrance into the shell. The seventh, or preceding segment, is also armed with a pair of long stiff bristles; these defensive weapons being vigorously used on the approach of any danger from behind. Numerous globular vesicles underly the abdominal region near the rectum. Judging from the renal organs in *Gammarus pulex* and some other crustaceans, we may conclude that they serve the same function as the kidneys in higher animals.

The carapace consists of two horny flexible oval pieces, soldered together along the dorsal line, but capable of a considerable degree of expansion along their ventral edges, whence the tail and most of the body can be protruded at pleasure. The cephalic portion of the carapace, as far back as the apex, is adherent to the body. Seen from above, it is heart shaped, the apex forming the apex. Where the free edges of the two valves constituting the remaining body carapace meet posteriorly, is produced, from the two valves, but in one piece, a long

coarsely toothed spine directed backwards, the length of which varies with the age of the individual, being longest at birth. The entire surface of this bivalved carapace is ornamented with rectangular markings, in the centre of each of which an opaque speck is often present, especially in adult specimens, giving to the shelly covering a shagreened appearance. These diamond markings are of specific value, as by them the *D. pulex* may be distinguished from all other members of the genus.

The large inferior antennæ are quite independent of the carapace, springing directly from below the point where the cephalic and bivalve portions of the carapace unite. Each antenna arises by a thick base having a ball-and-socket-joint : it subdivides into two jointed branches, each half the diameter of the base, and consisting of three articulations of about equal length. From the sides of the first and second joints respectively in one, and the second only in the other, arises a long slender filament, and from the tip of each branch three similar filaments, all of equal length, jointed about their middle, and delicately plumose along their margins. These large arborescent antennæ are the chief if not the only organs of locomotion. Close behind and parallel with the rostrum is located a pair of small antennæ, unjointed but tipped with ten short filaments. Within these superior antennæ are lodged the olfactory organs.

The five pairs of jointed feet are partly branchial and partly alimentary in function. Although furnished with numerous articulations, and highly plumose, they are adapted for neither crawling, swimming, nor indeed, are they capable of assisting the movements of the animal in the least. Whilst the individual is at rest, the feet are incessantly in motion, communicating to the surrounding fluid an undulatory flow which bathes their surfaces and aërates the blood circulating in large oval branchial plates situated behind the third, fourth, and fifth pairs.

The myology of this little creature can be readily followed through the transparent integument. The limbs, as in all *Arthropoda*, are hollow, and the muscular fibres to the several joints can be distinctly traced. The principal muscles are faintly striated transversely, and their arrangement is, for the most part, exceedingly simple. Those of the arms, mandibles, thoracic limbs and tail all arise from the first articulation immediately in front of and below the heart, whence a broad striped muscle proceeds to the dorsal margin of the carapace above and in front of the heart. The muscles of the abdominal limbs

arise near the articulations of the body segments to which they belong, each foot being provided with an *extensor* and *flexor*. Each arm has four principal muscles arising at various points along the dorsal line of the cephalic shield, giving off fibres to the several joints. A long narrow muscle, arising in front of the caeca, passes to the base of the labrum and deflects it, while a short muscle from the base of the beak, flexes the distal end of the labrum upon itself. The eye, which is capable of rapid and incessant semi-rotary movements, is governed by a plexus of muscular fibres, branching and anastomosing in a manner it would be difficult to describe. The circular anal sphincter is the part of the embryo first to exhibit that vitality which in the adult it is the last to forfeit. Its contractions and dilatations are often continued for fifteen or twenty minutes after all other parts of the organism appear to be dead.

Throughout *Arthropoda* the circulation is more or less extremely lacunar as in *Daphnia*. The apparent complexity which on first inspection their circulation presents is due to the fact that three distinct vascular systems are seen at once, and it is only by careful focussing that their separate courses can be clearly defined. These are the systemic, the branchial, and the tegumentary. The simple globular heart is suspended within a square thoracic cavity above the stomach, and is attached by the centre of its anterior aspect to the first (cephalo-thoracic) articulation. Close below this attachment lies an orifice out of which the large colorless corpuscles may be seen to emerge after each contraction. The pulsations are extremely rapid, ranging from 150 to 200 per minute when the animal is free, but they may be rapidly reduced at the will of the investigator down to 10 or even 5 per minute. The blood corpuscles on quitting the heart, proceed by a canal along the dorsal surface of the stomach as far as the coeca, where they divide to the right and left, floating freely in the perivisceral cavity, bathing the brain, gullet, labrum, mandibles, the lateral and ventral surfaces of the alimentary canal backwards to its termination at the rectum; round which they may be seen rapidly curving, and returning, by another canal, along the dorsal surface of the intestine and stomach; emptying its contents into the thoracic cavity behind and below the heart. The corpuscles then furtively find their way to one or other of two lateral slits situated on the upper surface of the heart. Such is the course of the systemic circulation:—forwards, from the heart to the brain on the dorsal aspect; backwards, from the mouth to the rectum ventrally; and forwards

again from the tail to the heart dorsally. But at a point on each side, near the base of the arm, where the systemic ascends by the mandible to pass under the stomach, it gives off two currents, a branchial and a tegumentary. The branchial current traverses the five pairs of plumose feet, entering each on the side nearest the heart; (the corpuscles floating freely within the branchial plates,) and, after being aërated, rejoins the systemic current below the abdomen. The tegumentary current passes down the anterior margin of the valves, proceeds along the ventral border, giving off numerous currents on its way that cross the carapace vertically; the main current continues along the posterior margin of the shell to the dorsal line, along which it receives the vertical currents, and empties itself into the thoracic cavity, immediately above the two inlets to the heart.

The sensory ganglia of higher animals are represented in the *Daphnia pulex* by what has thus far been called the brain. It is seen best from below. It consists of two lobes, the posterior, which is the larger, being sub-divided into two hemispheres united by a commissure, and each hemisphere communicates by another commissure with the anterior lobe, from the front of which the optic nerve proceeds to the eye. The latter is spherical, enclosing within a common membrane twenty apparently round lenses, but said to be pear-shaped when dissected out. In the early embryonic stages two dark specks are present on the head; one develops into an eye, the development of the other is arrested and remains rudimentary through life. It may be seen on the tip of the posterior lobe of the brain, just below the eye. The posterior ganglion gives off nerve fibres to a stellate ganglion situate at the base of the muscular expansion of the labrum. No representative of the ventral chain of ganglia common to other *Arthropoda* has been observed.

In common with most Crustaceans, the *Daphnia pulex* sheds its covering at stated intervals. These periodic moultings succeed each other most rapidly during its youth, when the body increasing in size requires a larger habitation. But after its growth is complete the presence of parasitic *Vorticellæ* and *Confervæ* renders a continuance of the process necessary; indeed, it not unfrequently happens that the carapace, large antennæ, and feet are so infested and overloaded with these incumbrances as to cause them to be incapable of performing the requisite functions for sustaining life, and the victim slowly pines away. The *Daphnia pulex* does not appear to possess the power of renewing lost limbs at each moult as most Crustaceans do. No

mutilated specimen has been met with during these investigations, and in every instance individuals accidentally maimed died shortly after. The moulting is very complete. The cephalic portion of the carapace is first freed from the body, after which the animal draws itself forward out of the remainder. Not only is the carapace cast off, but the entire tegumentary envelopes of the arms, body and feet, down to the minutest feathery fringe is removed uninjured, and the shed exoskeleton, when fresh, forms a pretty microscopic object.

The male *Daphnia* is distinguishable from the female by his diminutiveness, by the absence of the dorsal cavity, by the elongated articulated small antennæ, and by two long bristles, produced from the first pair of feet, constantly floating outside of the carapace. The *vasa deferentia* open upon the dorsal middle line of the last segment.

The ovaries are situated along the sides of the intestinal canal of the female, between the third and sixth articulations. The ova first appear as small pellucid nucleated globules, and after a few days are transferred to a clear space within the shell, on the back of the animal, where they remain unattached, (their escape being prevented by a tongue-like process arising in front of the sixth segment and closing the posterior opening outwards) until the young have quitted the eggs, undergone their first metamorphosis, and are capable of shifting for themselves, when they are expelled.

When first lodged within the dorsal marsupium, each ovum consists of a central transparent nucleus $\frac{1}{3}$ of its diameter, surrounded by a granular mass of a bright greenish hue. The nucleus sub-divides, forming a longitudinal row of globules, and the ovum elongates. The alimentary canal is developed from each end simultaneously, and the vitelline membrane or wall of the ovum is shed. The embryo then lies in a sac which closely accompanies the dorsal outline of the organism. The arms are evolved from the granular substance along the ventral border of the sac, and lie closely appressed upon the sides of the embryo. The eye specks next appear. The walls of the sac are absorbed or transferred into a carapace, then the tail strikes out vigorously, and the arms begin to flourish. Finally, the heart is formed, and the circulation may be distinctly seen, the pulsations often exceeding 300 per minute for some time before extrusion. The time occupied in bringing about these changes, always equals the time required for the stages of development within the ovary. If the ovum quits the ovary, for example, on the sixth day, the young will leave the parent on the twelfth day, but the length of time will vary with

the temperature ; when cold weather sets in it may be doubled or even trebled. The text-books tell us that the young are liberated by the moulting of the carapace. This is by no means invariably the case. The proportion of such instances, during the observations upon which this paper is based, has been not more than five per cent. of the whole. In several cases the parturition extended over five or six hours, indeed, this might be anticipated, as the development of those nearest the outlet is generally in advance of those lying near the heart. On one occasion the young were forced out when mature by accidental pressure upon the shell, and in another they were liberated artificially by drawing down the body. Both these broods did well, being mature, but to what extent contact with living membrane, in these and higher organisations, is necessary to development is still a moot point. All embryos or ova prematurely expelled invariably die.

The *Daphniæ* are extremely prolific, as many as thirty having been counted at a birth, and this number repeated weekly for some months. The young *Daphnia* cannot be said to undergo a series of metamorphoses comparable to those which the *Cyclops* passes, but besides the ova already indicated, (which, as in *Mysis*, may be compared to the Marsupials among Mammals,) certain changes are perceptible after each of the earlier moultings. At birth, the dorsal spine is long, coarsely serrated and flexible ; and in a day or two the body is too large for the carapace. At the third or fourth day the infant moults its first coat, after which the spine is lance-shaped, finely serrated and directed upwards, being no longer flexible. Eight days later it sheds its second covering, when the spine is reduced to half its previous length. In twelve days it moult for the third time, when, in form, it exactly resembles its parent, the ovaries may be seen to be charged with ova, and the tongue-like process now first appears. Ten days later it moult for the fourth time, and the ova are passed into the marsupium to be hatched ; meanwhile, fresh ova may be seen arising in the ovaries to be transferred to the dorsal cavity within a few hours of its being vacated by its previous occupants. Never more than two eggs are present at the first hatching, the number being increased at each succeeding birth until it reaches thirty, or, if other observers are to be followed, even forty, and any one brood is always all of one sex. After giving birth to its first batch of young, the *Daphnia* continues to increase in bulk, casting its integument as it grows, and not until after several more moultings and broods does it assume the perfect aspect of the adult.

The most remarkable features in the reproduction of *Daphnia* are that they present an example of parthenogenesis or "virgin generation," (the female being capable of reproduction without the intervention of the male); and that they lay two kinds of eggs. Male *Daphnias* are extremely rare, not more than two having been met with during these investigations, although some 600 *Daphnias* have been passed under the microscope. This paucity is explicable in view of the well-ascertained fact, that a single sexual intercourse suffices to fertilize the female, not only for the remainder of her own life, as in *Cyclops*, but also all her female progeny for several generations, indeed so long as the surroundings remain constant. A few observations will best illustrate these points.

A female having ova in the dorsal cavity was isolated on the 4th of February. The young born on the 9th were each placed in a separate glass tube. She gave birth to a second brood on the 17th, and a third on the 25th. The same day ova were placed in the cavity, but on the 28th a depression or bulge appeared in the dorsal portion of the carapace (a certain precursor of death), and she lingered on until the 12th of March, the development of the embryos meanwhile being arrested. One of her young, born on the 9th of Feb., hatched a brood on the 6th and another on the 26th of March, &c. Another incubating female isolated on the 10th of January, hatched on the 17th, again on the 5th of February, and died from *confervæ* on the 8th. One of her young born and isolated February 5th, therefore agamic, bore young on the 27th of March, on the 4th, 11th, 16th, 22nd, and 29th of April, &c. Numberless examples might be adduced, but these will suffice, if it be understood that in all cases each individual was completely separated at birth from its species, so that sexual intercourse was impossible.

Besides these agamic eggs so abundantly developed, the *Daphnia*, occasionally produces protected, "ephippial" eggs. The most posterior ovum in each ovary always differs from the rest, in having its nucleus surrounded by a series of brown corpuscles, and eventually it becomes an ephippial egg; but, according to the investigations of Lubbock (2), the presence of the male is necessary to mature it, otherwise it gradually fades away: when it continues, the remaining ova slowly disappear.

(To be concluded in our next.)

THE ALLEGED SUBMERGED FOREST NEAR HOLMFIRTH.

By CHAS. P. HOBKIRK.

ON the 19th February the Huddersfield Naturalists' Society, joined by the Heckmondwike Society, paid a visit to the reservoir now in course of construction at a spot near the Ford Inn called Hillicks, for the supply of water to the neighbouring village of Upperthong. The party consisted of about 40 gentlemen, and was joined on the ground by some members of the Local Board.

Mr. Plant states in his paper read to the Manchester Geological Society on 25th January : "The Upperthong reservoir lies in a shallow depression, between two long ridges of lower coal shales. The depression is a rushy marsh in the upper part, where it catches the drainage from the eastern flanks of Harden Moss, and at the lower end a small brook runs out to join the Holme at Bridge Mill below Holmfirth, and altogether the depression may contain about 40 acres of surface. The reservoir is dug out of a deposit of no great depth, which principally consists of clay and black boggy peat, both lying on coal measure shales. The depth of the peat and clay varies; an average depth would not exceed 6 feet; one measured section gave the following :—Surface, boggy turf, 1 foot; clay and marl, 2ft. 6in.; black peat, in which the stumps of trees occur, 4ft. 6in.; coal measure shales; total section, 8 feet. The excavation when he saw it was about 200 yards long by 70 yards broad, and had not been carried below the black peat and clay, yet in some places the hard shales were seen forming the floor upon which the trees had once grown. This area contained the prostrate trunks and upright boles of about thirty large trees, which had had the black peat removed from about them, but were otherwise undisturbed. The trees were lying with their heads pointing down the valley, in a direction north-west to south-east, and most of them had been snapped off, so as to leave about three feet of the hole standing, yet in one instance the whole tree had evidently been uprooted, the roots were firmly held in the clay and fissures in the shales. Some of these trunks were 30ft. long, and of good girth at the upper part, showing the age of such trees to be not less than half a century. The wood was black and

soft, but perfectly sound at the heart. The small branches and leaves had to be searched for in the heaps of black peat heaped on the banks of the excavations, and it was full of such matters. The trunks, which were clearly identified, were those of oaks, beeches, and birches, the latter predominating."

One or two exceptions must be taken to the above, though in the main it is quite correct. The locality is not on the lower coal measures, but on the third grit bed of the millstone grit series. I do not know in what part of the excavation Mr. Plant's measurement was taken, but quite in the centre of the reservoir a pillar had been left standing covered with growing grass on the summit, and this pillar gave the following measurement:—1 or 2 inches humus with rootlets of the grass, next about 10in. clay or marl, then 4ft. 6in. peat, then the clay bottom which was not cut through. Again, Mr. Plant says that in the trees the wood was soft and black, but sound at heart; in all those we examined this was not the case, and Mr. Brook, who had one of the best looking taken to his works to be dried with the intention of trying if it were possible to have any article of furniture made from it, informed us that when sawn through the heart was perfectly rotten and decayed, with a surrounding ring of much less decayed wood, but not sufficiently tenacious for any useful purpose. One of the trees, apparently an oak, had been broken off some 4ft. or more from the original ground surface on which it grew, but leaving the roots and rootlets *in situ* in the subjacent clay, thus showing that, at any rate, this tree was older than the surrounding peat, and the inference is almost clear that the other trees were rooted in the clay. With the main portion of Mr. Plant's conclusion as to the changes in the physical condition of this depression we may, I think, safely agree, viz:—"There can be no hesitation in classing these buried trees with those of which he had spoken, as found in the peat beds on the Lancashire moors, although the deposit is not exactly identical in some respects. The course of events appears to lead to a conclusion something like this. At one time in past ages, on the hills about Harden Moss, clumps of large oaks, beeches, and birches grew in vigorous health; suddenly by some catastrophe the trees were broken off near their roots, and fell prostrate, where they now are found. The drainage from Harden Moss soon after is stopped, and converts the place into a swampy bog. Peat is then formed and envelopes the trees, and the whole becomes dry and hard. After a time a small lake is formed over the peat; the waters from the higher ground

bear fine clay and marl, and spread it over the peat to the depth of about three feet; and the lake drains off, and marshy turf grows on the clay, and an aspect is thus given to the shallow depression, which appears to have existed from the earliest historical time."

The doubtful point in this conclusion seems to be as to the formation of a lake after the peat deposit. This may or may not have been the case, but it seems hardly likely; first, because the summits of the surrounding ridges are scarcely high enough to form a fair collecting ground for water sufficient to form a lake; and secondly, it seems more probable that the overlying 10 inches of loose clay, is rather the detritus brought down by the heavy rains, which are so frequent amongst these hills, than a lacustrine deposit; and besides, there are no traces of any kind of bank which could hold in the waters of a lake at the lower end, which below the present artificial embankment is the same marshy ground named above, from which the stream runs down on a gradual decline to join the Holme.

From the early portion of his paper, Mr. Plant would apparently have us draw the inference that, as on the Lancashire side, no trees can grow about here now but a few starved stinted beeches and firs, and this would seem to be borne out by a few similar trees surrounding this depression, but Mr. Plant seems to have overlooked the fact that in the Black Syke Valley, on the opposite side of the road and about 100 feet or thereabouts lower down, both oak, beech, and birch are growing in a large wood which extends to the summit almost of the opposite ridge. These trees are certainly not of the large diameter in the trunk that obtains in many of the buried ones, but still they are of very respectable dimensions, and many of them are more than 20 or 30 feet in height.

As to the age of this deposit or *buried* forest—for it can scarcely be called a submerged forest as we generally understand that term—Mr. Plant says nothing, at least the printed report does not. Indeed, it would be rather a difficult matter to determine it. It may have formed a portion of one of those great primeval forests which clothed many parts of this district prior to the Roman invasion, or it may have been much older, and perhaps, indeed, partially or wholly buried at that period. There is at present, however, no apparent data on which to base a satisfactory conclusion on this point. One point, at any rate, is clear that there has been no submergence; the forest has simply been covered over by another deposit, without any sinking, it is thus simply a *buried* not a *submerged* forest.

FURTHER REMARKS BY MR. J. TINDALL.

A remarkable peculiarity of the workings is the great number of prostrate trees, viz., oak, birch, and hazel; and the nutshells of the last are plentifully distributed in the surrounding peat, and the perforations in their sides seem to indicate that this small wood was then the abode of the nuthatch which doubtless thus punctured the shell for the purpose of getting at the kernel, as the modern habits of this bird abundantly prove.

This peat bed is covered by a few inches of clayey soil, (evidently derived from the adjoining beds of shale) surmounted by a growth of grass and rushes, and the whole having been surface drained, has been used as grazing land.

Former visitors to these very interesting diggings have dignified them by the appellation of *a submerged forest*; I can safely say there is no evidence of submergence in the case, and I attribute the covering of the fallen timber and peat to the natural disintegration and denudation of the shale on the north side by the ordinary operations of nature.

Short Notes and Queries.

THE RAINFALL OF FEBRUARY (Huddersfield).—The total this month has been 3·01 inches, in 22 days (including five days on which snow fell). The heaviest fall occurred on the 14th, when 0·47in. was registered. The total amount of rain since January 1st has been 3·96 inches against an average for 1866-75 of 5·92. The ten years' average for February is 2·59—slightly under the figure given above. The month has been warmer than often, west and south-west winds having been prevalent, and only seven days of east and north-east.—J. W. ROBSON.

Dalton, 15th March, 1876.

Reports of Societies.

BRADFORD NATURALISTS' SOCIETY.—Meeting Mar. 7th, the president, Mr. E. Margerison, in the chair.—The president read a paper on "The Generation of Animals." Worms, millipedes, and polyps were first considered; he then gave a detailed account of fishes and birds, from the laying of the eggs, describing the various processes the animal passes through to its hatching, and gave a minute account of the progress of viviparous animals from their impregnation to birth. He quoted the various ideas held by Hippocrates, Aristotle, Harvey, Buffon, and others on the subject. A very lively discussion followed the read-

ing of the paper. Mr. R. Spencer exhibited a pair of jays ; Mr. W. Airey, *Anisopteryx aescularia*, taken during the week ; Messrs. J. Fryer and B. Illingworth, collections of trout eggs, from some of which the young trout had emerged.—J. W. W. BROOK, Hon. Sec.

GOOLE SCIENTIFIC SOCIETY.—Meeting March 8th, the president, Mr. M. A. Morris, in the chair.—A paper was read by Mr. James Savage, L.R.C.P., on “The Heart and circulation of the Blood.” The author said that physiology could never be an exact science until the nature of life itself was known, but that our knowledge of the function of the circulation of the blood more nearly approached completeness than that of any other branch of the science. This knowledge was in great part due to the labours of William Harvey, an English physician of the seventeenth century. He then described the position of the heart in the chest (oblique only in man and the higher apes), its division into four cavities, its structure and the course of the circulation, the aids to the circulation, the respiratory and other muscular movements, the presence of valves in the veins, and the elasticity of the coats of the blood vessels. The stop-cock action of the muscular coat of the smaller arteries, the action of the valves, and the retardation of the circulation due to the increased sectional area of the smaller ramifications of the arteries were pointed out. The lecture was illustrated by diagrams, recent specimens, and by injected sections, exhibited by the president

and Mr. Hunter.—H. FRANKLIN PARSONS, M.D., Hon. Sec.

HECKMONDWIKE NATURALISTS' SOCIETY.—Meeting 4th March, Mr. J. M. Barber, vice-president, in the chair.—It was announced that Mr. Margerison, president of the Bradford Society, would read a paper at the next meeting (April 1st) on “The Ocean our Natural Storehouse.” Several carboniferous fossils were exhibited, including *Lepidodendron*, *Sigillaria*, *Calamites*, and *Pecopteris*. Mr. J. L. Adamson reported that a pair of merlins had been captured at Rawfolds, near Cleckheaton.—J. DEARDEN, Hon. Sec.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting February 19th, the president, Mr. G. T. Porritt, F.L.S., in the chair.—Mr. Richard Jessop exhibited the roseate form of *Erythraea Centaurium* from first year's growth. The discussion on “Corals,” adjourned from January meeting, was opened by Mr. Joseph Tindall. Mr. A. Spiegel then read a most interesting paper on “Chemistry in the Economy of Nature,” after which a lively discussion ensued. For want of time, it was decided to postpone the discussion on the result of that day's excursion to Holmfirth, until the next meeting.

Meeting 6th March, Mr. C. P. Hobkirk, vice-president, in the chair.—The following specimens were exhibited :—By Mr. James Varley, *Caprimulgus ruficollis* red-necked goat-sucker, and *Loxia Pityopsittacus*, parrot crossbill (female), both from Scotland ; by

Mr. Dore, *Serpula*; by Mr. S. L. Mosley, a case containing some beautiful specimens of silkworms, viz., *Bombyx cecropaea* and *B. Cynthia*, from North America, *B. Yamamai*, China, and *B. peryni*, Japan, some cocoons and prepared silks. Mr. Conacher presented a series of birds' eggs for the cabinet, and Mr. Varley mentioned having seen several fine examples of *Scolopax major* (great snipe) exposed in Huddersfield market. Specimens of *Fontinalis antipyretica*, *Corylus Avellana*, *Petasites albus*, *Salix caprea*, and *Polypodium vulgare* were on the table. Mr. Edward Brooke, F.G.S., opened the discussion on the alleged submerged forest at Holmfirth, which was continued by other members, a digest of which will be found on page 138.—GEORGE BROOK, ter. Hon. Sec.

MEETING March 18th, the president, Mr. G. T. Porritt, F.L.S., in the chair. The secretary, Mr. G. Brook, read a very interesting and instructive paper on "The Metamorphoses of Insects," which he illustrated by means of the large microscope, with beautifully-mounted specimens of the different organs, &c., of various orders of insects. A discussion ensued.

MIRFIELD NATURALISTS' SOCIETY.—Meeting 4th March, the vice-president, Mr. Simeon Kaye, in the chair.—A paper was read by the secretary on the plants which had been seen in bloom in this district in the months of January and February, and a discussion followed. About thirty specimens of plants in an early stage of growth were pro-

duced and named. *Ranunculus hederacea*, *R. ficaria*, and *Stellaria media* were produced in bloom.—E. STOKS, Hon. Sec.

NORTH STAFFORDSHIRE NATURALISTS' FIELD CLUB.—Meeting at Hanley, Feb. 17th. Mr. J. Ward, F.G.S., president, in the chair.—Mr. W. Scott, F.M.S., of Barlaston, for many years the meteorological correspondent of the *Advertiser*, read a valuable and interesting paper on "Climate, with special reference to the Climate of North Staffordshire." Mr. Garner, F.L.S. in proposing a vote of thanks to Mr. Scott, bore his testimony to the thoroughness with which that gentleman had studied meteorology, and to the great value of the records which he had kept for many years. In order to give some idea of the quantity of water which falls in the form of rain, Mr. Scott said that an inch of rain was equivalent to 101 tons of water on an acre of ground. (Consequently, in 1872, when the rainfall at Barlaston reached 50·03 inches, upwards of 5,000 tons fell on every acre.) The Rev. T. W. Daltry, F.L.S., followed with an account of the lepidoptera added to the North Staffordshire list during the season of 1875. The number added to the list given in the volume of the Society's Transactions is 25, raising the total from 379 to 404. The total number of British species is 983, but Mr. Daltry had little doubt that if North Staffordshire were thoroughly worked it would be found that the list of lepidoptera indigenous to the district would be considerably increased.

STAINLAND NATURALISTS' SOCIETY.—Meeting at Barwood, March 6th, Mr. S. Calvert in the chair. W. H. Stott read a paper on "Summer Migratory Birds." C. C. Hanson exhibited eggs of missel thrush, chiff-chaff, great tit, and chaffinch. The chairman exhibited flints found on Greetland Moor, said to be hatchet head, scraper, slingstone, sand flint flake.—**CAIUS CASSIUS HANSON,** Hon. Sec.

WAKEFIELD NATURALISTS' SOCIETY.—Meeting March 16th, the president, Mr. Joseph Wainwright, F.L.S., in the chair. Mr. Talbot exhibited a living wasp which was taken at Mount Pleasant on the 26th of February. Mr. Henry Simms reported *Pieris rapæ* taken in Southgate, Feb. 17th.—**JOHN SPURLING,** Hon. Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Annual meeting March 8th, Mr. H. R. Moiser, F.G.S., in the chair. The hon. secretary read the report of the past session:—The increase of numbers is steady, and the monthly meetings have been well attended. Many rare and valuable specimens of natural history had been exhibited. At the May meeting, the secretary, on behalf of Mr. Sawyer, exhibited a specimen of *Eupithecia extensaria*, a species new to Britain, which had been named by the late Mr. Henry Doubleday. The latter gentleman says it is a very striking and rare species, and has never been captured before out of Russia, it was taken by Mr. Sawyer, near Hull, in June, 1873. Several

species, new to the local fauna, have also been taken (which have been noticed in the monthly reports in the *Naturalist*). Excursions were made during the summer to several well-known collecting grounds, and many specimens taken. The following gentlemen were elected officers for the ensuing year:—president—E. Birchall, F.L.S.; vice-presidents—H. R. Moiser, F.G.S., and T. S. Wesley, M.B.; treasurer—William Simmons; hon. secretary—Mr. Prest; and five members of the committee. Mr. Helstrip exhibited the little owl, with the young and eggs; also eggs of the little egret. Mr. Dennis, bred specimens of *Eupithecia albipunctata* and *Phigalia Pilosaria*; Mr. Robinson, *Nyssia hispidaria*, bred from larva taken at Cawood, and *Notodonta trepida*; Mr. Simmons, iron ore from Ireland and Sweden, and a large specimen of rock crystal; the secretary, specimens of *Helix virgata*, from Sherburn; Mr. Wolstenholme, a fine specimen of the glossy ibis (*Ibis falcinellus*), and read a very interesting description of this curious bird.

[We have little doubt the specimen of *Eupithecia extensaria* alluded to above was accidentally imported, probably as a pupa.—*Eds. Nat.*]

ERRATUM.—March No., p. 125, l. 12—11 from bottom: for "rubiginosa," read "fuliginosa"; and, l. 3 from bottom, for "Ziliaria" read "Tiliaria."

Diary.—Meetings of Societies.

- April 1. Heckmondwike, Clayton West, Mirfield, Honley.
,, 3. Barnsley, Stainland, Todmorden, Huddersfield.—Paper,
C. P. Hobkirk, Notes on Physical Geography of
the District.”
,, 4. Liversedge, Bradford,—Paper by R. Spencer, “On the
domain of Physical Science; Leeds,—President’s
opening address.
,, 5. Entomological Society of London—Holmfirth.
,, 6. Linnean Society of London—Wakefield.
,, 8. Ripponden, Middlestown, Paddock.
,, 10. Rastrick and Brighouse.
,, 11. Leeds—Exhibition of Specimens, &c.
,, 12. York.
,, 15. Honley, Huddersfield—Paper by Rev. W. Fowler, “On
Sandstones.”
,, 17. West Riding Consolidated—Excursion to Garforth,
Meeting in Picture Gallery of Mechanics’ Institute,
at Leeds, at 5 p.m.
,, 18. Bradford : Paper, “On the deep Sea.”—By the President.
,, 20. Linnean Society.
,, 22. Paddock.
,, 25. Leeds : Paper, “A year’s Science.”—By Ed. Thompson.
,, 29. Heckmondwike, Ovenden, Honley.

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No. X.

MAY, 1876.

VOL. I.

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HUDDERSFIELD :

B. BROWN, MARKET PLACE CORNER.

TO CORRESPONDENTS.

The Editors will esteem it a favor, if the Secretaries of Field Clubs and Naturalists' Societies throughout the Kingdom will favor them with occasional Notes of their proceedings and Excursions, when of interest.

Papers read at Meetings of these Societies, or otherwise, on any branch of Natural History, will be gladly received and inserted in full, if of sufficient general interest, or in abstract, if of only local interest.

All communications, except Advertisements, Exchanges, or Short Queries, should, if possible, be in the hands of the Editors not later than the 18th of the current month, to insure insertion in our next issue, and should be written on one side of the sheet only.

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Original Articles.

THE ORGANIZATION OF *DAPHNIA PULEX*.

(Concluded.)

BY THOMAS TATE, OF BRADFORD, YORKS.

THE two ephippial eggs are transferred to the dorsal cavity in the usual manner; become opaque, of a greenish hue, and then development is arrested. Each ovum acquires a horny sheath, and both, on quitting the parent, are enclosed in a single saddle-shaped chitinous bivalved case or "ephippium." These envelopes are modifications of the dorsal portion of the carapace, the inner wall forming the sheath of each egg, and the outer, the ephippium. Between these two walls the new carapace arises, and the ephippium, with its enclosed eggs, is shed at the next moult, when the discarded carapace appears with a bit snipt out of its dorsal portion. Ephippial eggs are met with all the year round, not in autumn only, as the text-books affirm. Agamic eggs and offspring are highly sensitive to temperature or drought, and but for the ephippials the germs would rapidly become extinct.

The reproduction of *Daphniadæ* is so often inaccurately associated with other modes of evolution, that it may be worth while briefly to review one or two of these statements. It is not unfrequently cited as a case of "alternation of generations." In the sense in which Steenstrup (3) uses the term, we have an example in the *Salpæ*—free and chained. The free *Salpa* produces viviparously a "concatenate" *Salpa*, along a tube, from the surface of which two parallel rows of buds arise, which, when mature, float away in living chains. Each bud develops an ovum and sperm-cell, the offspring of which is a free *Salpa*. Each free *Salpa* is a "nurse" for chained *Salpæ*, just as *Tænia solium* is a "nurse" for *Cysticercus cellulose*. Wagner (4) finds that the larvæ of certain gnats, allied to *Cecidomyia*, do not always produce perfect insects, but give birth to other larvæ, which undergo metamorphoses of the usual character, and eventually become gnats. So again among *Hydrozoa*: the fixed fissiparous *Hydra tuba* evolves the free swimming oviparous *Chrysaora hysoscella*, a medusa, the egg of which in turn, reproduces the *Hydra tuba*.

To "alternation of generations," as exemplified in these cases, the reproduction of *Daphnie* presents no comparable phenomena. In

N. S., VOL. I.—MAY, 1876.

(3) Publications of Ray Society, vol. 4, 1845.

(4) Zeit. für Wiss. Zool. 1863; compare "The Origin of Species," p. 317 (6th edition).

"alternation of generations," A produces B, never A; the latter is always the offspring of B: but with the *Daphniæ* it is A only, all through the series.

The resemblance to the reproduction in Hymenoptera, which some writers detect, is equally fanciful. The males of the hive bee (*Apis mellifica*), always arise from the unimpregnated ova, and those eggs which, if impregnated, would have produced females, will, if no spermatozoa are present, give birth to males. But with *Daphniæ* fertilization stands in no relation to the evolution of sexual forms.

Even to describe this mode of reproduction as "parthenogenesis," not only must we abandon the vital principle of the theory, viz:—that virgin products exhaust the spermatic virtue; but we have also to depart from the typical example. The winged and perfect *Aphis* produces wingless hexapod larvæ, and these, in the absence of males, again produce their like through numerous generations, all summer; the last brood gives rise to perfect winged insects, true male and female, the fertilized ova of which lie over winter, and in spring develop wingless larvæ. But the two kinds of ova of *Daphniæ* are evolved synchronously, and the offspring always resemble their progenitors. The nearest analogy to Daphniadæ is among those Rotifera (*Asplanchna*, &c.) which hatch their agamic ova, and also lay "winter eggs," for the development of which the male element is requisite.

Huxley (5) defines an individual as the total product of a fertilized ovum. But this conclusion is not without its difficulties. If it be true, there is no such thing as a male individual *Daphnia*, *Apis*, or *Aphis*, no more than is a tree raised from a cutting an individual tree. "Every organism springs from an egg" is a well-known axiom. But what is an egg? Take a *Hydra viridis*, on the outer surface of which three little prominences have arisen. One shall enlarge, develop tentacles, and float away to reproduce its kind. The other two will also expand, one will contain a nucleated the other a non-nucleated cell; when freed, the latter will be absorbed by the former, and another polypite will arise, exactly resembling the product of the first prominence, and inheriting the same vital powers. We call one a bud, the other an ovum. Wherein lies the difference; is not every ovum essentially a bud? Doubtless. But buds are a stage of development, not of reproduction. They are of two kinds, barren and fertile. The agamic ova of the *Daphnia* are fertile buds; the ephippial eggs are barren buds, the impregnation of which is the first stage of reproduction.

THE BIRDS OF WAKEFIELD :

With particulars of the occasional visits of Rare Species, and of those that have been observed to breed in the neighbourhood,

FROM 1845 TO THE PRESENT TIME.

—
BY WILLIAM TALBOT.
—

(CONTINUED FROM PAGE 124.)

STURNIDÆ.

STARLING (*Sturnus vulgaris*)—

Is exceedingly common all the year round. It is a great friend to the farmer, and richly deserves all the encouragement and protection he can give to it ; it renders him great assistance in clearing the land of mischievous insects.

CORVIDÆ.

CARRION CROW (*Corvus Corone*)—

I have found it breeding at Newland, Haw Park, and Bullecliff Wood ; amongst young pheasants and partridges it is a most destructive bird.

HOODED CROW (*Corvus Cornix*)—

Is a winter visitor. On several occasions I have received specimens to preserve which had been shot in this neighbourhood. A remarkably large female was sent to me by Mr. Ball, who had shot it at Hickleton whilst feeding on the dead carcase of a sheep.

ROOK (*Corvus frugilegus*)—

Nearly every gentleman's estate in the neighbourhood possesses a rookery. In the spring of the year it is amusing to watch the pertinacity with which they steal from one another the materials to make their nests, and on the approach of a man the clamorous noise they make is almost deafening.

JACKDAW (*Corvus Monedula*)—

Breeds commonly in this district. Before the rebuilding of the Parish Church spire, jackdaws built regularly in the tower and spire, but I am sorry to say that they have completely deserted it since.

MAGPIE (*Pica caudata*)—

May be found every year, nesting within a short distance of the town.

JAY (*Garrulus glandarius*)—

Breeds somewhat plentifully in the woods. By its alarm note it frequently warns keepers of the presence of trespassers.

PICIDÆ.**GREEN WOODPECKER (*Picus viridis*)—**

In 1861 I found a nest in Haw Park, and since that date I have seen it at Nostell, Hickleton, Bretton Park, and Woolley Park.

GREAT SPOTTED WOODPECKER (*Picus major*)—

This bird is not uncommon in this district. I have found it breeding several years in succession in Haw Park, and frequently I have seen the bird at Newmillerdam and Nostell, and once at Methley and Cawthorne Park. I have eggs in my collection taken from a nest in New Park Spring.

LESSER SPOTTED WOODPECKER (*Picus minor*)—

Is much rarer in this district than the two last-mentioned. A nest of young birds and a pair of old ones taken at Newmiller-dam, were sent to Mr. Parkin in June, 1858, to preserve. I have seen this bird twice at Nostell, and once at Haw Park.

WRYNECK (*Yunx torquilla*)—

In taking a walk through Cannon Hall Park, in May, 1875, I saw a pair of these birds, which evidently were intending to breed in the neighbourhood.

CERTHIADÆ.**CREEPER (*Certhia familiaris*)—**

Breeds at Nostell, Newland, Haw Park, and Newmillerdam. In one of the old ivy-covered elms at Newland, I found the little creeper had ensconced its nest about five feet from the ground in a crevice between the ivy and the tree. On my approaching it, out came six young ones, and like so many mice ran up the bole of the tree with the greatest ease; and as I moved from side to side, they as quickly decamped to the other. In winter time this bird usually associates with members of the titmouse family.

WREN (*Troglodytes vulgaris*)—

In spring I often meet with the large and beautifully constructed nest of this diminutive bird. In whatever position it may be placed, it will invariably be found to be built of materials which

correspond in colour with the prevailing tint of surrounding objects; I have seen them with the outer covering composed of delicately green moss, others covered with silvery lichen, whilst some are encased in dead leaves or withered ferns. Once I found this tiny one's house forming quite a picture as it nestled in a thick honeysuckle, the leaves of which were interwoven with long green moss. It will bear comparison with the nest of either chaffinch, goldfinch, or longtailed tit, whose skill in nest building has been so highly lauded by ornithologists. Considering the smallness of the wren, its voice is very powerful; it makes the woods and meadows resound with its loud but brief song.

HOOPOE (*Upupa epops*)—

In 1854 I saw a specimen of this gaily-plumaged bird in the possession of Mr. Wright, of Wakefield, who told me it had been shot at Fryston.

NUTHATCH (*Sitta europaea*)—

Two were shot in 1853 by Mr. Firth, and one in 1855 by Mr. Link—both within a short distance of the town.

CUCULIDÆ.

CUCKOO (*Cuculus canorus*)—

This summer migrant may be often seen in this district, and its voice may be heard in almost every wood and hillside meadow during its stay. Although it scorns, like many another biped, to toil to provide a house for itself, yet it has some compunction in its appropriation of the nests of others, as it never lays more than one egg in the same nest. I have found an addition made by the cuckoo to the eggs of the pied wagtail, hedge accentor, meadow pipit, and yellow bunting. My earliest note of its arrival is the 9th of April, and as late as the 30th of September I have had young birds brought to me.

HALCYONIDÆ.

KINGFISHER (*Alcedo ispida*)—

In five localities near the town the kingfisher breeds almost every year; in one of these places, however, I am sorry to say the eggs are often taken. The readiest mode of discovering the nest is to take a terrier which is fond of hunting rats by the waterside, and he will not pass a nest—particularly during incubation—without drawing attention to it. The stench from

the fishbones which the female has ejected whilst sitting is something fearful. It is among the earliest breeders. I have found its nest, containing young, on the 23rd of April. In the winter of 1873-4 they might be seen daily by a small reservoir inside the prison, where they were carefully protected by Captain Armytage, the governor. I am glad to say that they are again visiting the same place.

HIRUNDINIDÆ.

SWALLOW (*Hirundo rustica*)—

This favourite bird, whose coming is noted by almost every one, breeds plentifully with us. It may be seen gliding over the waters of the Calder at Kirkthorpe and Thornes several days earlier than at any other place in this district. My earliest date of its arrival is the 4th of April, and its latest departure the 17th of October.

MARTIN (*Hirundo urbica*)—

The number frequenting this district has gradually decreased since 1862. In that year I observed sixteen nests built in the blank windows of the chapel inside the prison. The house sparrows, which are constant residents, kept up a continual battle with their visiting brethren, and many were the attempts to drive the whole colony away in order that the former might possess themselves of the snugly-built nests; after several years warfare the martins gave way, and it is now five years since the last brood was seen in the prison. Last year there was a marked falling off in the number visiting us; at Dircar, where they have usually built freely, I could only find nine nests. The times of arrival and departure are the same as those of the swallow.

SAND MARTIN (*Hirundo riparia*)—

Is much more plentiful than either of the two last; it breeds on the banks of the Calder, and very abundantly in the gravel pits near Woolley and in the stone quarries at Woolley Edge. I have seen them skimming over the Dam at Woolley in such large numbers that it seemed almost impossible for them to avoid coming into collision. My earliest note of its arrival is the 3rd of April and its latest departure the 14th of October.

SWIFT (*Cypselus apus*)—

Formerly bred plentifully in the town and neighbourhood, but during the last nine years it has gradually decreased in numbers,

and now it is becoming very scarce. The apparently small mouth of this bird when closed, undergoes a marvellous change when opened, the head seems to disappear and become all mouth; when one is shot and its mouth examined it will be found, in breeding time, to contain a ball of small insects which it has collected in the air for its young. The quantity of insects destroyed by it daily must be immense. My earliest date of its appearance is the 6th of May and latest departure the 20th of August.

PICIDÆ.

GREEN WOODPECKER (*Picus viridis*)—

In 1861 I found a nest in Haw Park, and since that date I have seen it at Nostell, Hickleton, Bretton Park, and Woolley Park.

(*To be continued.*)

C O A L - P L A N T S.*

BY MR. JNO. BUTTERWORTH.

(*ABSTRACT.*)

MR. BUTTERWORTH said: The vegetable origin of coal is now generally admitted, but whilst some contend for the idea that the vegetation forming the different coal seams grew on the spot, in the form of very extensive marine swamps, others contend that this vast amount of vegetable matter was brought down large rivers from higher latitudes, and deposited in large estuaries. The latest theory is that propounded by Professor Huxley, which sets forth that coal is very largely formed by the accumulation of vast quantities of spores, the product of extensive tracts of lycopodiaceous plants. In proof of this theory he instances a seam worked about Bradford, and one in Leicestershire, which contain large quantities of flattened rounded bodies, which he calls the spore bags or sporangia of the plant just named. They bear no resemblance, however, to the sporangia of *Lepidostrobus*, which is regarded by every student of fossil botany as the fruit of a gigantic lycopodiaceous plant known as the *Lepidodendron*. The chief evidence in favour of the second theory is the larger quantity of earthy matter found in these seams in comparison

* Read at Ovenden Naturalists' Society.

to all other seams. He was ready to admit that very large rivers existed during former geological ages, and that the growth of vegetation was then on a much larger scale than now; but all our coal seams, except those just named as containing much earthy matter, favor the first-mentioned theory—that the vegetation forming them grew on the spot where it is now found. This conclusion is arrived at from the fact that every seam of coal (except those just mentioned) has an underlying clay, in which the plants forming the coal first took root, and this under-clay is now found to be literally crammed with these roots and rootlets; and then the fact that this underclay always contains the roots, and the shale above the coal seam always contains the leaves and branches of the coal-plants, is good evidence that they grew on the spot. How often do we find *Sigillaria* standing erect with (*Stigmaria*) its roots embedded in the under clay, and that part of the tree which has passed through the coal seam has been also changed into coal, while immediately above the upper part of the tree towers away through the bed of shale, sometimes 30 or 40 feet.

Until within a few years, the fossil botanist had no light to guide him in his researches into the character of the coal-plants, except the outward markings on fragments of flattened stems and branches, and this evidence is found to be very deceptive, since it has been discovered that several specimens which had been named as belonging to so many different species are nothing more than different parts of one and the same plant: as, for instance, the large trunks of *Sigillaria*, with *Stigmaria* roots attached, found at Dukenfield, and now preserved in the Museum, Manchester.

What has been said of *Sigillaria* may also be said of *Lepidodendron*, as well as all other fossil plants. Those sandstone casts of *Calamites* found in quarries have been represented as exhibiting all the characters of the external appearance of the plant, whereas they are only the casts of the inner parts of the calamite. He should be able to show a section of a perfect calamite, with the bark attached. There is, in the neighbourhood of Oldham, a seam of coal called the foot-mine, which is very like in character to the hard bed here. Over both seams are found large quantities of fossil marine shells, as *Nautili*, *Goniatites*, *Orthoceratites*, *Pectens*, &c., and in both seams are round nodules, containing fossil plants in a most beautiful state of preservation. It is evident from the composition and character of these nodules that the plants were calcified before bitumenisation set

in, otherwise they would have been converted into coal. From the large number of fossil marine shells met with just above this seam it is inferred that the waters which submerged the seam must have been very highly charged with carbonate of lime in solution, and hence the suddenness with which these fossil plants were calcified.

Some idea of the delicate character of the structure of some parts of these fossil plants may be gathered from the fact that the striated vessels in *lepidodendron*, and the vessels in the centre of the rootlets of *stigmaria* are striated with a second stria, which extends between the first striæ in a transverse direction, and require very delicate manipulation to see them. In speaking of the wonderfully perfect state in which some of these fossil plants are found, he pointed out that it was far from being the common feature of fossil plants ; the large plants are nearly all decorticated.

The structure of some plants has often to be made out by cutting up several specimens. One specimen may show the pith and woody cylinder round it, but be destitute of the bark, while another may have no pith, yet a perfect woody cylinder, and just a small bit of bark.

Mr. Butterworth then proceeded to describe some of the plants found in the neighbourhood, by means of diagrams, some of which had been lent for the occasion by Professor Williamson. The distinctive characters of nearly the whole of the carboniferous fossil flora were clearly pointed out in the diagrams, and microscopic sections of the plants shown to the audience by means of hand microscopes. He pointed out the very close relationship between *sigillaria*, *lepidodendron*, and *ulodendron*, which were nothing more than gigantic club-mosses, while *calamites*, *asterophyllites*, *zygopteris*, and several other undescribed plants were the ancient representatives of the modern horsetails of our ditches. The ancient ferns were unmistakeably allied to our modern ferns.

Short Notes and Queries.

NOTES ON RARE BIRDS, DURING THE AUTUMN AND WINTER MONTHS,
ABOUT BARNSLEY.—*By T. Lister.*

1875.

Sept. 14. *Querquedula crecca* (teal).—Two pairs seen on the Dearne, near Day House, Barnsley.

- Sept. 25. *Aegialitis hiaticula* (ringed plover).—One of these birds, rare with us, was obtained near Day House.
- Oct. 23. *Hirundo rustica* (swallow).—Last noted by Mr. Henry Garland Woodhall.
- ,, *Buteo vulgaris* (common buzzard).—One shot by Mr. J. Machen, of Newhall, on the moors beyond Penistone.
- Nov. 21. *Turdus musicus* (thrush).—Young birds essaying their first song in gardens near the town.
- Dec. 1. *Squatorala Helvética* (grey plover).—Very rare in these cultured districts ; noted many days by Mr. Henry Garland in large flocks.
- ,, *Charadrius pluvialis* (golden plover).—With the above species, also seen often near Day House.
- ,, *Vanellus cristatus* (green plover or lapwing).—Seen frequently with the last species and separately.
- Dec. 8. *Ardea cinerea* (the common heron).—One flew over Gamber, another over Ardsley, doubtless from some of our Yorkshire parks, where they are yet preserved. May we hope that Walton, the paradise of birds in Waterton's time, will again have its herony.

1876.

- Jan. 1. *Turdus viscivorus* (Mistle thrush) in song.
- ,, *Fuligula cristata* (tufted duck).—One caught alive on Cannon Hall Pools.
- ,, 4. *Turdus musicus* (song thrush).—Uttered its first song of the year
- ,, 12. *Coccothraustes vulgaris* (hawfinch).—A female caught in the stable yard, Wentworth House, and preserved alive—another proof of the finest member of the finch family occurring in Yorkshire in winter as well as summer. Many have bred in our district.
- ,, 28. *Turdus merula* (blackbird).—In song.
- ,, *Fringilla cælebs* (chaffinch).— do.
- Feb. 24. *Emberiza citrinella* (yellow-hammer).—In song.
- Mar. 4. *Emberiza miliaria* (common or corn bunting).—In song.
- ,, *Saxicola rubicola* (stone chat).—One sent by Mr. C. Wemyss, Cannon Hall. This is another instance of this warbler being found in Yorkshire in winter ; a pair were noted early last March on Houghton Common. Its allies the summer warblers are due throughout next month, and the attention of naturalists must be called to the first date of their appearance.

THE RAINFALL OF MARCH.—The rain during March has reached 4·11 inches in 26 days, on 12 of which snow fell. The heaviest fall (0·53 in.) occurred on the 13th. The deficient rainfall of January has now been made up, the total during January, February, and March having been 8·11 inches against an average for ten years (1866-1875) of 8·05 in. From Feb. 17 to March 19 (32 days) no day was free from rain, and the fall during this period was 4·80 in. Only on the last of these 32 days was the wind easterly, and east and north-east winds have only prevailed for seven days during the month. In spite of this, however, the weather has been unusually disagreeable, even for March. The grumbling from the correspondents of the *Meteorological Magazine* is general, and uniform from all parts of the kingdom. We notice that at Seathwaite, in Borrowdale, the total fall (12·80 in.) was rather below the average.

Dalton, 18th April, 1876.

J. W. ROBSON.

CURIOS SPOT FOR A NEST.—Alderman W. H. Aston, J.P., reports that on his farm at Bradley, near Huddersfield a song thrush (*Turdus musicus*) has built its nest in an old tea-kettle, which had been hung on a tree by one of the keepers, to be out of the way. Mr. Aston first noticed this a week or two ago, when he gave strict orders that the birds should not be disturbed; and when he last saw it there were three eggs in the nest, and the hen-bird was sitting.

Reports of Societies.

BRADFORD NATURALISTS' SOCIETY.—Meeting March 21st, Mr. E. Margerison (president) in the chair. After the usual business of the meeting had been transacted there was an exhibition of specimens. Amongst lepidoptera were the following species, most of which had been taken in the neighbourhood during the past fortnight:—*Cymatophora flavicornis*, *Hybernia leucophaearia*, *Anisopteryx aescularia*, *Phigalia pilosaria*, captured and exhibited by Messrs. H. Andrews, W. Lambert, and J. W. W. Brook.

MEETING April 4th, Mr. J. Firth (vice-president) in the chair.—Mr. R. Spencer read a paper, which

gave account of his experience in the bush during a two years' stay in Australia. The following specimens were exhibited at the meeting:—common gull by R. Spencer, *Amphydasis betularia* and *Cymatophora flavicornis* by H. Andrews and W. Airy.—J. W. W. BROOK, Hon. Sec.

GOOLE SCIENTIFIC SOCIETY.—Annual Meeting April 12th.—The report of the committee shows the Society to be in a flourishing state, the number of members having increased during the year by 24, and the balance-sheet showing a small balance in hand after payment of several items not originally contemplated. The great want of this Society is a larger number of

active workers, and the committee earnestly urge the younger members especially to cultivate a practical acquaintance with some branch of science, so as to be able to add to the general stock of information. The Society has joined the West Riding Consolidated Naturalists' Society. The following were elected office-bearers for the ensuing year : — president, Mr. Hunter; vice-president, Mr. Morris ; secretary, Dr. Parsons ; and five members of committee. It was decided to form a library of works of reference. After the meeting a soiree was held, which was largely attended by members and their friends. A highly interesting lecture on "The Theory of Evolution considered from a geographical point of view," was given by Dr. Kelburne King, Mayor of Hull, and a number of objects of interest were exhibited by members and friends. — H. FRANKLIN PARSONS, Hon. Sec.

HECKMONDWIKE NATURALISTS' SOCIETY.—Meeting 1st April, Mr. J. M. Barber, vice-president, in the chair. A few plants showing the early flora of the district, were exhibited by Mr. J. L. Adamson, and named by the chairman, and specimens of the three-spined stickleback by Mr. Robt. Smith. A paper was read by Mr. Margerison, president of the Bradford Society, on "The Ocean, our Natural Storehouse," which opened with a short description of the anatomy of fishes in general, and continued with their early origin and fossil remains, and stated that were a Royal Commis-

sion to sit and enquire justly into the present state of our fisheries, it would confer more benefit to the population at large than all the Royal Commissions that will sit during the present Parliament, as the present cost of fish renders it rather a luxury for the rich than food for the masses. A short history of several fishes, describing their habits, food, when in season, and where caught, concluded the paper.—J. DEARDEN, Hon. Sec.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting April 3rd, the president, Mr. G. T. Porritt, F.L.S., in the chair. Amongst the specimens exhibited were a beautiful example of *Dodona* from the Crosland Moor quarries, by Mr. Zilliken ; a collection of various botanical specimens by Mr. A. Spiegel ; a number of interesting ornithological specimens from the Falkland Islands, by Mr. C. P. Hobkirk ; a nice series of *Cymatophora flavigularis*, from Black Fir Wood, by Mr. James Varley, who reported the species as having been common this spring ; European specimens of *Chærocampa Nerii*, *Eulechia grammica*, *Lasiocampa ilicifolia*, *Notodonta bicolora* and *Macrogaster arundinis*, by Mr. S. L. Moseley ; and specimens of some species of *Helix* obtained from amongst Egyptian corn by Mr. Joseph Tindall. Mr. Walter S. Rowntree reported having found a nest of the long-tailed tit at Woodsome the previous day. Mr. James Varley stated that a field of potatoes near his house, which had been left in the ground from last

year, had during the last few weeks been scooped out in thousands by the rooks ; he was surprised these birds should take so greedily to a vegetable diet. Mr. J. Tindall suggested that probably the potatoes were by this time infested with wire-worms, or some *Agrotis* larvæ, which would be the attraction. A most interesting paper on "The Physical Geography of Huddersfield," was then read by Mr. C. P. Hobkirk, in which, after referring to previous papers on the subject, he decided to confine himself entirely to river action in the formation of our valleys ; and by a number of diagrams, showing partly the effects of river action, and partly the form of various local valleys, he showed how the latter had been formed, in some places leaving high cliffs as at Spa Wood, in others outliers as at the Round Wood, Kirkheaton, &c. A very animated discussion on the subject ensued.

MEETING April 15th, the president in the chair.—Mr. Allen Godward exhibited a fine specimen of *Sigillaria alternata* from Liversedge. The president exhibited preserved larvæ of *Noctua xanthographa* and *Tryphæna pronuba* ; Mr. Joseph French *Flustra foliacea*, on which he made a few interesting remarks. Mr. George Brook presented to the library the series of seven volumes of "Macmillan's Science Primers." The Rev. W. Fowler, M.A., of Liversedge, then read a most interesting paper on "Sandstones," illustrated by numerous specimens, on which a lively discussion ensued.—GEO. BROOK, Hon. Sec.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—205th Meeting, April 4th—the opening of the new session. The chair was occupied by the retiring president, Mr. Henry Pocklington, F.R.M.S. The death of Mr. G. W. Newton, one of the founders of the Club, was mentioned. The new president, Mr. Samuel Jefferson, F.C.S., then delivered his inaugural address, taking for his topic "The Domain of Science."

206TH MEETING, April 11th, Mr. Samuel Jefferson, F.C.S., president, in the chair.—The evening was occupied by microscopical matter. Mr. Washington Teasdale and Mr. S. S. Peat exhibited various forms of microscopes ; Mr. W. E. Clarke showed *Melicerta ringens* with the spot lens illumination ; the president, various forms of rotifers and diatoms, and Mr. Ed. Thompson also showed diatoms.—W. DENISON ROEBUCK, Hon. Sec.

MIDDLESTOWN NATURALISTS' SOCIETY.—Meeting April 8th, Rev. H. Greene, president, in the chair. Mr. George Jackson gave a short account of the life of the common white butterfly (*Pieris brassica*). Sixteen plants were produced in bloom, including *Viola odorata*, *V. canina*, *Anemone nemorosa*, &c.—T. H. RUSHFORTH, Asst. Sec.

MIRFIELD NATURALISTS' SOCIETY.—Meeting 1st April, Mr. L. Holt in the chair. Many miscellaneous objects in natural history were exhibited through a powerful microscope by the Rev. S. Firman. A

number of plants were produced and named, amongst which was the pretty wood anemone in full bloom.

NORTH STAFFORDSHIRE NATURALISTS' FIELD CLUB. — Annual Meeting, March 16th, at Stoke, the president, Mr. J. Ward, F.G.S., in the chair.—The hon. treasurer, Mr. W. D. Spanton, read the annual financial statement, showing a balance in hand of £16 16s. The hon. secretary (Rev. T. W. Daltry, F.L.S.) read the eleventh annual report of the committee, from which it appeared that the Club continues prosperous. The past year had witnessed the accomplishment of two events, which would exercise a considerable influence over the affairs of the Club. In the course of the summer the volume of selections was published, and the latter end of the year had been marked by the introduction of a system of sections into the operations of the Club. The remainder of the committee's report consisted of a *résumé* of the reports of the excursions, the meetings, and the papers read by members. The following officers were appointed : president, Mr. F. W. Molyneux, F.G.S. ; treasurer, W. D. Spanton ; secretary, Rev. T. W. Daltry. The retiring president then read his address, of which we give a condensation. He commenced by taking a retrospective view of the work done by the Club in the past, and briefly referring to the many valuable papers on archaeology, geology, botany, and other branches of natural history which had been brought before the

Club. He spoke in praiseworthy terms of the volume of selections recently published, and complimented Mr. Cherry, the honorary editor, on the care he had taken in its compilation. Remarking that clubs of this kind were valuable nurseries for teaching the rudiments of science, the president proceeded to show what an ample field there was afforded for investigation in the animal and vegetable world, and how an interchange of thought, so necessary to a full inquiry of this kind, was brought about by means of field clubs. He advocated the division of members into sections, each section to be led by some person well qualified to instruct in one or more special branches of science ; and exhorted all the members to be more diligent in the pursuit of science, so that it might not be said their excursions were only cheerful pic-nics.—The paper contained an ample *résumé* of the geology of the district.—T. W. DALTRY, Hon. Sec.

RASTRICK AND BRIGHOUSE NATURALISTS' SOCIETY. — Meeting 13th March, the president, Mr. Edwin Whiteley, in the chair.—There was a very good collection of specimens, botany, geology, entomology, lepidoptera, coleoptera and conchology being all well represented. After some preliminary business concerning the revision of the Society's rules, Mr. G. B. Wentworth named the specimens of botany, 51 of which were upon the table. Mr. B. Brummitt named a number of exotic ferns and flowering plants. Mr. W. Kaye exhibited some

splendid cases of butterflies, moths, and beetles, together with male and female specimens of the American locust and grasshopper. Mr. G. L. Lister named a number of shells, amongst others *Helix virgata*, *Cochlicopa lubrica* and *Zonites crystallinus*. Mr. A. Firth exhibited a large calamite upwards of two feet long; Mr. E. Whiteley a very peculiar deposit of oxide of iron in a piece of free stone, which has a great resemblance to a sword blade.

MEETING 10th April, the president in the chair. A goodly number of specimens in several branches of natural history were exhibited, in botany upwards of 70, amongst them being *Daphne laureola*, *Chrysosplenium alternifolium*, *Ranunculus auricomus*, and *Narcissus pseudo-narcissus*—all in bloom. Mr. Henry Kershaw exhibited and named a number of exotic ferns and flowering plants; Mr. G. L. Lister some fresh-water shells; Mr. W. Kaye the eggs of the song thrush, and a specimen of the poplar hawk moth (*Smerinthus populi*) in the pupa state. W. W. TURNER, Hon. Sec.

STAINLAND NATURALISTS' SOCIETY.—April Meeting, the president, Mr. J. E. Garside, in the chair, who exhibited red-throated grebe and the American musk-rat. Mr. C. C. Hanson exhibited eggs of sedge warbler, redstart, house martin, and blue titmouse. Papers were read and discussed on animals and birds.—C. C. HANSON.

WAKEFIELD NATURALISTS' SOCIETY.—Meeting April 14.—The secretary produced the new microscope

purchased on behalf of the Society from contributions subscribed for the purpose. Mr. Sims exhibited *C. Flavicornis* (taken in Haw Park), *C. ferrugata*, *P. pilosaria*, *A. Pudibunda*, *T. rubricosa*. Mr. Talbot exhibited a white barn owl, in good condition, full flesh, it having had the two anterior claws of the right foot cut off; they were quite grown over, it having evidently been trapped. He also reported the wheatear as having arrived in this neighbourhood on the 4th of this month.—JOHN SPURLING, Secretary.

WEST RIDING CONSOLIDATED NATURALISTS' SOCIETY.—The first meeting and excursion of the season took place on Easter Monday, the 17th April. The excursion was to the neighbourhood of Garforth, near Leeds, on the Magnesian limestone, and to Barwick-in-Elmete, where the rector, Rev. C. A. Hope, M.A., gave an interesting account of the antiquities in the Church and the Hall Tower Hill, a series of ancient British earthworks supposed to have been once occupied by the celebrated Northumbrian King Edwin, and near to which he stated that the battle of Winwaid Field was fought in 655, when Penda the Mercian was routed and slain. Owing to the lateness of the season and a wet morning, the naturalists, although mustering in great force, had but little sport, and returned with but small bags to Leeds. The meeting was held in the Picture Gallery of the Mechanics' Institute, Leeds, the president (Mr. J. Wainwright, F.L.S.) in

the chair, and was numerously attended by members from the local societies of Huddersfield, Clayton-west, Wakefield, Ovenden, Stainland, Holmfirth, Liversedge, Mirfield, Bradford, Leeds, Goole, and York. The president read an interesting address on the present aspect of general and natural history science, referring to some recent discoveries. The plants, which were but few in number, were named by Rev. W. Fowler, of Liversedge, V.P., *Paris quadrifolia*, *Viola hirta*, *V. Riviniana*, and *V. odorata* being the most noteworthy; and Dr. H. F. Parsons, of Goole, brought a small moss, which has since been determined to be *Pottia carifolia*, var. γ . The other mosses were of no particular rarity. Mr. W. Talbot, of Wakefield, had heard or seen the following birds during the day:—song thrush (*Turdus musicus*) ; blackbird (*T. merula*) ; hedge accentor (*Accentor modularis*) ; red-breast (*Erythaca rubecula*) ; willow warbler (*Sylvia trochilus*) ; chiff-chaff (*S. rufa*) ; *greater tit (*Parus major*) ; * blue tit (*P. caeruleus*) ; pied wagtail (*Motacilla Yarrellii*) ; meadow pipit (*Anthus pratensis*) ; skylark (*Alauda arvensis*) ; yellow bunting (*Emberiza citrinella*) ; chaffinch (*Fringilla cælebs*) ; greenfinch (*Coccothraustes chloris*) ; * magpie (*Pica caudata*) ; wren (*Troglodytes vulgaris*) ; * ring dove (*Columba palumbus*) ; and * peewit (*Vanellus cristatus*) : all in full song with the exception of those marked (*). Dr. H. F. Parsons, of Goole, and Mr. H. R. Moiser, F.G.S. of York, produced a few specimens of *Axinus*

obscurus, and an *Ostreæa* from the limestone of Garforth ; and some further remarks on the geology of the district were made by Messrs. J. Tindall and J. Spencer. Messrs. Nelson and Taylor, of Leeds, spoke on the conchology of the excursion, and exhibited specimens they had gathered of *Planorbis vortex*, *P. spirorbis*, *P. complanatus*, *P. cornutus*, *P. contortus*, *Physa hypnorum*, *Lymnaea glabra*, *Anodonta cygnea*, *Succinea putris*, *Zonites cellarius*, *Z. nitidulus*, *Z. alliarius*, *Z. purus*, *Z. crystallinus*, *Z. fulvus*, eleven species of *Helix*, *Bulimus obscurus*, *Clausilia rugosa*, *Cochlicopa lubrica*, and var. *lubricoides* ; and Mr. Porritt, F.L.S., of Huddersfield, made some remarks on a few larvæ gathered. Mr. Abbott, of Leeds, spoke of the richness of the flora of the Garforth district, but regretted that the excursion had been fixed for so early a date, as most of the plants found there flourished at a later period.—On the motion of Mr. Porritt, seconded by Mr. Hobkirk, Mr. W. Denison Roebuck, secretary of the Leeds Society, was unanimously elected to the post of annalist of the joint societies. Votes of thanks to Col. Gascoigne for permission to visit Parlington Park, and to the rector of Barwick-in-Elmete for his address on the earthworks, and to the committee of the Mechanics' Institute for the use of the Picture Gallery, were unanimously passed, on the proposition respectively of Dr. Parsons, Mr. Talbot, Mr. W. Prest, of York, and Mr. Hunter, of Goole, and the last by Messrs. Hick and Jefferson, F.C.S., both of Leeds.

Diary.—Meetings of Societies.

- May 1. Huddersfield : Paper by Mr. Samuel Bairstow.
,, 2. Leeds, Bradford, Liversedge.
,, 3. Entomological Society of London. Holmfirth.
,, 4. Linnean Society of London. Wakefield.
,, 6. West Riding Consolidated—Excursion to Horbury, for Coxley Valley. Meeting in the Church Schoolroom, Middlestown, at 5 p.m.
,, 8. Rastrick.
,, 9. Leeds : Paper, "The Roman Wall."—Mr. James Irwin Coates, F.R.A.S.
,, 10. York. Geological Society of London.
,, 13. Huddersfield : Paper, "Mountain Limestone."—Mr. C. H. Bould. Ripponden, Honley, Middlestown.
,, 16. Bradford : Paper, "The Earth's Crust."—J. Magerison. Leeds.
,, 20. North Staffordshire : Excursion to Norbury, Ellastone, &c. Paddock.
,, 23. Leeds : Paper on "The desirability of our forming local collections."—Mr. William Nelson.
,, 24. Linnean Society of London. Geological Society of London.
,, 27. Heckmondwike, Ovenden, Honley.
,, 29. Huddersfield : Paper, "Luminous Insects."—Mr. Wm. Clegg.
,, 20. Leeds. Bradford.

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N.B.—The Editors will be obliged if those gentlemen who have not already sent their Subscriptions, will be kind enough to do so; and any gentlemen desirous of subscribing should send their names without delay.

COMMUNICATIONS have been received from W. H. Pearson, York Field Naturalists' Society, &c.

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Papers read at Meetings of these Societies, or otherwise, on any branch of Natural History, will be gladly received and inserted in full, if of sufficient general interest, or in abstract, if of only local interest.

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Original Articles.

ON QUARTZ.*

By H. R. MOISER, F.G.S.

(ABSTRACT.)

QUARTZ is the most abundant of all minerals. Considered as to its chemical composition, it consists chiefly of silica with a slight admixture of various other substances, which impart to it the different shades of colour. In a pure state it is distinguished by the formula Si O_2 and is known under two modifications, one of which is insoluble in water and all known acids excepting the hydrofluoric, and the other soluble in water at high temperatures, especially in presence of acids and alkalies. The insoluble variety of quartz may in process of time become converted into the soluble variety under the influence of infiltrated moisture. The soluble variety is found in nature in the water of many springs, especially those which are hydrothermal, as the Geysers of Iceland, also in rivers and the sea. Quartz crystallises in the hexagonal system, and occurs most commonly in the form of six-sided prisms terminated by pyramids, or in the form of single or double pyramids. The faces of the prisms are frequently transversely striated, while the faces of the pyramids are commonly plain and smooth. The cleavage is very imperfect, *i.e.*, it exhibits no tendency to split in any one direction in preference to any other, and breaks with a conchoidal fracture and vitreous or resinous lustre. In its purest form it occurs as rock crystal, otherwise called Bristol, Buxton, or Irish diamond, which is clear, transparent, and colorless; frequently, however, it is variously colored by foreign substances either mechanically or chemically combined, in the former case more or less opaque, in the latter commonly transparent. Rock crystal occurs either (1) in crystals or crystalline grains, or (2) as a constituent of crystalline or sedimentary rocks. In the sedimentary strata the rolled massive quartz is the most abundant, where it forms flint nodules, sandstones, puddingstones, conglomerates, grits and sands.

Brown or smoky quartz owes its colour to the presence of carbon and nitrogen. Rose quartz is a massive rose-coloured variety inclining to violet blue, and occurs at Ben Macdhui, in Scotland, and at Rabenstein, in Bavaria, whence it has obtained the name of

N. S., VOL. I.—JUNE, 1876.

Read at York and District Field Nat. Soc., April, 1876.

Bavarian ruby. Its colour is attributed to the presence of the oxides of titanium and manganese. Common quartz is crystalline or massive, white, or grey; also red or brown, and is a very common constituent of rocks. Chalcedonies comprise the varieties of quartz which possess a scaly fracture, and are susceptible of a fine polish; flints, on the other hand, have a smooth, even fracture, dull colour, and cannot readily take a polish. Chalcedony is white, grey, blue, green, yellow, or brown, and occurs in stalactitic reniform or botryoidal masses. Heliotrope or bloodstone is a dark green variety with red spots of jasper. Agates are mixtures of chalcedony in layers with jasper, amethyst, or common quartz, and abound in the amygdaloïds of our own and other countries.

Origin. Reverting to the primitive history of our globe, when the solid materials of the earth were in a state of igneo-aqueous fusion, surrounded by a dense atmosphere of carbonic, sulphuric, and hydrochloric acid gasses, it is supposed by Dr. Ste:ry Hunt that subsequent upon a certain amount of cooling, an acid rain would fall upon the fluid mass, and decomposing the silicates of potash, soda, lime, magnesia, iron, &c., the carbonic, sulphuric, and hydrochloric acids would unite with the liberated bases, and silica being set free, would precipitate in the form of massive or crystalline quartz.

With reference to the occurrence of quartz in fissures, we cannot doubt that ancient, like modern veins, have been channels for the discharge of subterranean mineral waters, containing silica in solution, which, rising towards the surface, would deposit crystals of quartz in the sides of the fissures, as a result of the deduction of solvent power consequent upon a diminution of the pressure as the waters rise nearer the surface. The waters of our river-springs, &c., as previously remarked, are more or less charged with silica in solution, derived from the weathering and disintegration of felspathic and other siliceous rocks, the silica of which being separated by chemical agencies, appears in sedimentary deposits, forming concretions, and even beds of flint, chert, and jasper, as well as various crystalline sandstone. These crystalline sands are, according to Daubrée, met with in beds in the sandstone of the Vosges, the Trias, and Permian, and in the tertiary of the Paris basin and elsewhere. All quartzose conglomerates, and the majority of sandstones are undoubtedly mechanical deposits from the ruins of pre-existing quartzose and granite rocks. Vast beds of quartz also have an organic origin being derived from the spiculæ of sponges as well as from silicieous diatoms.

GEOLOGY OF THE HALIFAX HARD BED COAL.*

BY J. SPENCER.

ALL round the out-crop of the great Yorkshire coal field, ranging in a semi-circle, from Leeds to Denholme, and round by Halifax and Leeds to beyond Sheffield, there are a series of beds of coal, clay, shale, and sandstone, from 500 to 600 feet in thickness, known as the lower coal measures. They are capped by the well-known flag-rock—which is so extensively quarried in this neighbourhood at Ringby, Queensbury, and Northowram—and everywhere form a bold escarpment of several hundred feet in height above the millstone grit country. There is a fine example of the general character of this escarpment in the range of hills from Swill Hill to Ringby, Beacon Hill, Southowram, and the Ainleys. These strata yield two workable beds of coal known as the hard bed coal and the soft bed coal, the latter being the lowest, and at an elevation of about 27 yards above the rough rock, while the former lies 25 yards above that. The difference between these two beds is very remarkable, both on account of their mineral characters and also of their associated strata. The soft bed is a very fair coal, but unfortunately only a thin one, being but 16 inches in thickness, and the character of the enclosing strata is very much the same as the character of those about the middle and upper coal measures. The hard bed is generally a very impure coal, containing a great deal of sulphur in the form of iron pyrites, carbonate of lime, sulphate of lime, &c., and requires great care in freeing it from these impurities before it is fit for use. It is generally about 27 inches in thickness. This coal is the one generally alluded to as the “Halifax coal,” and there are so many interesting facts in connection with it, that it is no exaggeration to affirm that it is one of the most important beds, geologically speaking, in the whole of the Yorkshire coal field. In the first place it has for its floor the peculiar and well-known gannister rock—so frequently met with in the millstone grit and Yoredale rocks; in the next place the coal itself is highly charged in some places with roundish nodules of iron pyrites (brass lumps) and balls of carbonate of lime, both full of vegetable matter—plants broken into fragments. The admirable state of preservation in which these plants are found enables us to affirm with confidence that they were not only land plants, but that they actually grew on the spot where we now find them.

* Read at the Ovenden Naturalists' Society.

It will be well to bear in mind this great fact, as it will enable us to comprehend the great change in physical geography which took place before the next layer above it was formed. This layer is almost entirely composed of marine shells, belonging chiefly to the genus *Aviculopecten*, but having associated with it many other genera of marine shells. The *Aviculopecten* bed is about from three to six inches in thickness, and is overlaid by a bed of shale of about three to six feet in thickness, containing a large number of nodular concretions, locally called "baum pots." They derive their name of "baum pots" from the peculiar odour which they emit when first opened. They are of all sizes, from that of a child's ball up to a foot or more in diameter, and are composed of carbonate of lime, with a thick coating of pyrites. It requires great force to break them open, and it is attended with some little risk, on account of the hardness and brittleness of pyrites, which fly about in all directions, not paying the least regard to hands, face, or legs of the fortunate or unfortunate (as the case may be) operator. But when the balls are broken open, they are found to contain a large number and variety of marine fossil shells, belonging to the genera *Goniatites*, *Nautilus*, *Orthoceras*, *Bellerophon*, *Buccinum*, *Nucula*, *Aviculopecten*, *Posidonia*, &c., and also fish remains, sometimes the whole fish admirably preserved. *Goniatites*, of which there several species, are by far the most numerous fossils, and occur in every stage of growth, from some so minute that it requires the aid of the microscope to discern them, to others several inches in diameter.

The *Nautilus* is at once the most beautiful and one of the rarest of fossils. Several species are met with in these balls. The geological pedigree of the *Nautilus* is one of the most ancient and most continuous of all the most varied forms of life, found in the earth's crust. It is found in the old Silurian rocks, and extends throughout all the succeeding formations, and a few forms still linger on in tropical seas. In this respect there is a great contrast in the history of the *Goniatite* and the *Ammonite*, which appear to have delighted in exactly the same conditions of climate as the *Nautilus*. The *Goniatite* came into existence in the Devonian era, and swarmed in myriads in the early carboniferous period in this country, and finally, so far as we know, came to an end in the sea in which this marine-bed of ours was deposited. The *Ammonite* swarmed in countless numbers in the lias and oolite, and finally disappeared towards the close of the chalk period.

(To be continued.)

THE BIRDS OF WAKEFIELD :

*With particulars of the occasional visits of Rare Species, and of those
that have been observed to breed in the neighbourhood,*

FROM 1845 TO THE PRESENT TIME.

BY WILLIAM TALBOT.

(CONTINUED FROM PAGE 151.)

CAPRIMULGIDÆ.

NIGHT JAR (*Caprimulgus Europaeus*)—

Breeds at Ardsley, Newland, and Woodmoor: but owing to its nocturnal habits it is seldom seen by casual observers; the entomologist occasionally meets with it when out at nights sugaring. The date of its arrival is very difficult to fix with accuracy: the earliest time I have noted it is the 24th of May, but I am convinced that it reaches us before that date.

COLUMBIDÆ.

RING DOVE (*Columba palumbus*)—

In spring time the cooing of the ring dove resounds through every wood in the district; occasionally one meets with its nest, if such a rude collection of twigs and roots of grass can be called a nest; the wonder is how such a shapeless structure can retain the eggs during a breeze.

STOCK DOVE (*Columba oenas*)—

Breeds at Wadsley Cragg, Hemsworth, Cawthorne Park, and Kirklees, but only sparingly. The birds and eggs in my collection came from the last place.

PHASIANIDÆ.

PHEASANT (*Phasianus colchicus*)—

The artificial system of breeding now generally adopted has been the means of largely increasing the number of pheasants; in confinement the hen lays at least double the quantity of eggs that she does in a wild state. One of these nurseries that I visited contained upwards of five hundred young pheasants; I have observed on several occasions, when I have had the privilege of watching these birds in confinement, that they provide no nest whatever, but simply drop the eggs on the bare ground. In many districts it is very difficult to obtain a pure-bred English

bird : they have been so crossed with the Bohemian, tinged, and other varieties, that for some time I have not seen one which did not exhibit, more or less, marks of crossing either on the neck, wing, or rump.

TETRAONIDÆ.

RED GROUSE (*Lagopus Scoticus*)—

Mr. G. G. Ianson informs me that in passing through Haw Park in the winter of 1872, he observed the red grouse, and a few days after he mentioned the circumstance to Mr. Ingleby, the gamekeeper, who told him that he had shot the bird a day or two previously.

PARTRIDGE (*Perdix cinerea*)—

Is very plentiful in this district, and would be abundant if a little more attention was paid to them in the breeding season ; many nests are destroyed by mischievous people, and in other ways. In walking up Seccar Lane towards Woolley Edge, I suddenly came upon a brood which had apparently been just hatched : it was most amusing to see the old birds feign lameness, and, whilst this was being done, the young ones disappeared in a most marvellous manner.

QUAIL (*Coturnix vulgaris*)—

In the autumn of 1856 I saw two which had been shot by Mr. Firth, at Wilbeck Farm, whilst they were feeding among the stubble. Mr. Ianson informs me that on the 3rd October, 1870, he saw two when out shooting on Ardsley Common, near Wakefield, one of which he shot ; one was also killed in the neighbourhood of Lofthouse 10th October, 1864.

CHARADRIIDÆ.

GOLDEN PLOVER (*Charadrius pluvialis*)—

Visits this district during the winter and spring months. On the 19th of April, 1874, I saw thirteen on the banks of the reservoir at Cold Hiendley ; I noticed that they were far advanced in their summer plumage.

DOTTEREL (*Charadrius morinellus*)—

Mr. Gough, ornithologist, Almondbury, received five birds, shot at Shepley : they are in nearly full summer dress.

(*To be continued.*)

YORKSHIRE HEPATICÆ.

BY W. H. PEARSON, MANCHESTER.

THE following notes are taken from Dr. Carrington's work on the British Hepaticæ, which is now being published, and as the book is probably beyond the reach of many, these notes on the Yorkshire stations may be useful to working naturalists.

Scalium Hookeri. Gray and B.—A very rare and local species, first discovered by C. Lyell, Esq., is recorded from Barnaby Moor, near York, by R. Spruce, 1842. It fruits in summer.

Nardia adusta.—Recorded from Castle Howard, by R. Spruce.

Nardia compressa. Gray and B.—Gathered by the late John Nowell, at Todmorden, but whether on the Lancashire or Yorkshire side of the Calder I cannot determine: from the moors on the west side of Ingleboro' it has been collected; the leaves are pellucid, and tinged either purple or claret colour, always growing near water-courses.

Nardia obovata. (N. ab E.)—Often overlooked for *Nardia hyalina*.—Kildale, North York, W. Mudd, grows forming compact tufts of a deep green colour, and producing abundant fruit in early summer: damp rocks.

Nardia hyalina. Lyell.—Fruits in early summer, and forms more or less depressed tufts on wet slaty rocks or intermingled with bog mosses; it is remarkable for the crystalline glaucous green semi-pellucid foliage and reddish rootlets. The late G. E. Hunt found it at Hebden Bridge, and it has been collected from alum shale, at Whitby, also at Ingleboro'.

Trichocolea tomentella. Dumort.—Is one of the noblest and most interesting of our native Hepaticæ, reminding us of some tropical types, and not likely to be confounded with any local species. It grows abundantly in Bolton Woods, where it has been gathered in fruit.

Saccogyna viticulosa. Dumort.—The fruit of which is exceedingly rare, has been gathered near Todmorden.

Harpanthus scutatus. Spruce.—Grows in dense, compact tufts on rocks or decayed trunks of trees, is found on rocks near the Strid, Bolton woods.

Plagiochila interrupta. Dumort.—Grows abundantly on dry shady rocks near the Strid and other parts of Bolton Woods, Wharfdale, found with capsules May, 1857; also gathered on Malham Moor. Care must be taken not to confound *P. interrupta* with *Chiloscyphus polyanthus* which sometimes grows intermingled with it in the Wharfe valley, although generally preferring a moister habitation.

Plagiochila asplenoides.—Bolton Woods.

Var. minor.—On rocks in subalpine districts, such as the scar limestone of Craven and oolitic moorlands of Yorkshire, mostly barren. The late John Nowell found near Austwick, West Yorkshire, a very graceful variety.

Plagiochila spinulosa. Dumort.—Bolton woods and Ingleboro', rare. John Nowell.

Mylia Taylori. Gr. and B.—Ayton Moor, Yorkshire, Wm. Mudd. Summit of Ingleboro'. Fruit very rare; spring.

Scapania nemorosa. Dumort.—Comparatively local. Bolton Woods abundant. Clapdale Craven, Airyholme wood, and Bilsdale: W. Mudd. Fruits in June.

Scapania resupinata. Dumort.—Moorlands of North and West Yorkshire. Ilkley Wells in fruit.

Scapania æquiloba. Dumort.—Rather rare. Bolton Woods, Ingleboro', Giggleswick Scar, Malham Cove.

Scapania Bartlingii. N. ab E.—Rare on damp shady rocks by streams. First recognised as British from specimens collected on rocks near the Strid, Bolton Woods, Yorkshire, April, 1858. This adds another item to the list of rarities which have made Bolton Woods classic ground to the cryptogamic botanist: also in Teesdale: W. Mudd.

Scapania curta. Dumort.—Yeadon.

var. *spinulosa*, Esholt Wood.

Short Notes and Queries.

THE RAINFALL OF APRIL.—During April 2·14 inches of rain fell in 19 days. The maximum daily fall occurred on the 9th and 10th, on each of which 0·36 inches was registered. Snow fell on four days. The total rainfall of the four months is again very close to the average of 1866-75, having been 10·21 inches, against the average of 10·12 inches.

Dalton, 1st May, 1876.

J. W. ROBSON,

PECULIAR FORM OF *Endymion (Agraphis) nutans*.—The ordinary form of this plant with us, has the flowering stem furnished below each flower, with two bracts, having the same insertion as the pedicel. Before the flowers open, these bracts are very short, in fact they do not exceed the length of the bud, and afterwards become coloured and somewhat longer, but never, so far as my experience goes, do they exceed one inch in length, seldom $\frac{3}{4}$ of an inch. In “Nees ab Esenbeck’s *Icones Genera Plantarum*,” the bracts are figured as not exceeding the length of the pedicel, about $\frac{5}{8}$ to $\frac{7}{8}$ of an inch on the lowest flower. In the specimen brought by Mr. Jno. Armitage to the Huddersfield Naturalists’ Society (see p. 171), the flowers were only in bud : but the bracts had already attained a length of nearly 3 inches on the lowest flower, and from $1\frac{1}{2}$ to 2 inches on the others, all reaching higher than the uppermost bud on the spike ; they are of a bright green colour : the outer one, clasping the stem slightly at its insertion, is nearly $\frac{3}{8}$ of an inch wide, and gradually tapering ; the pedicel springs from the centre of the base of this bract, and the inner bract alongside the pedicel is somewhat shorter than the outer one, and has its internal faces closely applied to each other, so that it seems only half the width it is in reality. I am informed by Mr. R. Jessop, who first found this plant growing plentifully in a wood near Mirfield, and who has watched it for some years, that when the flowers are fully opened, the bracts, still remaining green, sometimes reach a length of more than 4 inches, and hang down on all sides. I should be glad to know if a similar form has been found elsewhere ; it grows in two localities near here.

Huddersfield, 8th May, 1876.

CHAS. P. HOBKIRK.

On the grounds of J. Woodhead, Esq., Sandal Common, the blackbird (*Turdus merula*) took up its abode the first week in March, and built its nest on an ivy wall, and brought up three young ones ; now that they are flown, the old birds have commenced incubation a second time in the same nest, which I consider of very rare occurrence.—THOMAS MARSON.

Sandal, 13th May.

DEATH OF MR. THOMAS WILKINSON.—We deeply regret to have to record the death of Mr. Thomas Wilkinson, the well-known Yorkshire entomologist, which took place on the 13th of April, at his residence in Scarborough. Mr. Wilkinson (who was 58 years of age at the time of his death) was best known as a micro-lepidopterist, and his collection of this order of insects was one of the best in the country. He did not, however, neglect the macro-lepidoptera, and his beautiful bred specimens of *Cerura bicuspis* adorn a number of our cabinets. *Acronycta alni* was another of the “plums” he used to take. The last few years he had given a good deal of attention to British coleoptera and trichoptera ; and the science of entomology is indebted to him for the discovery of several

species, one or two of which bear his name. We shall not soon forget the pleasant chats we have had with him when looking over his neatly-set collections, &c.—G. T. P.

Reports of Societies.

BRADFORD NATURALISTS' SOCIETY.

—Meeting April 18th, Mr. E. Margerison, president, in the chair. Among the plants exhibited were *Primula elatior*, *Adoxa moschatellina*, *Chrysosplenium alternifolium*. An interesting paper on “The deep Sea,” was read by the president.

MEETING May 2nd, Mr. J. Firth, vice-president, in the chair.—The meeting was devoted to conversation and exhibition of specimens; the chairman suggested that notes of observations should be made on the birds found in the neighbourhood, with the dates of arrival and departure of the migrants, and it was arranged that rambles should take place during the season for this and similar purposes.

MEETING May 16th, the president in the chair.—The lepidoptera exhibited included *Acherontia Atropos*, *Tryphæna interjecta*, &c. Amongst plants were *Myrrhis odorata*, and *Lathyrus macrorrhizus*. A paper on “The Earth’s Crust” was read by the president, in which, after alluding to the earliest formations of the earth’s crust, he described the different strata of rocks, and their succession in time.—J. W. W. BROOK, Hon. Sec.

GOOLE SCIENTIFIC SOCIETY.—The first excursion of the season

was made on Saturday, May 13th, with the Selby Naturalists’ Society, to Conisborough. There was a fair attendance from both Societies, and the weather was all that could be wished. The party drove from Doncaster to Sprotborough, where they were kindly shown over the church, &c., by the vicar, the Rev. G. F. Surtees. The church contains some interesting antiquities, especially a stone sanctuary chair, believed to be of pagan Saxon date. The excursionists were also shown through the grounds of Sprotborough Hall, and then walked through the rocky woods which border the lovely valley of the Don to Conisborough, where the castle, with its lofty and massive Norman keep, was duly examined. On the route many interesting plants were gathered, including *Taxus baccata*, *Aquilegia vulgaris*, and *Convallaria majalis* (all native), *Helleborus viridis* (denizen), *Lamium galeobdolon*, *Lithospermum officinale*, *Orchis mascula*, *Viola hirta*, &c. At Warmsworth many good sections of the magnesian limestone were seen, and at the brick-yards at Conisborough the junction of that rock with the coal measures was well exposed, together with the upper beds of the latter series: hardly any fossils, however, were found.

H. F. PARSONS, M.D., Sec.

HECKMONDWIKE NATURALISTS’ SOCIETY.—Meeting 29th April, the president, Mr. T. B. Oldfield, in the chair. The specimens exhibited

included a few botanical and local geological : *Stigmaria*, *Lepidodendron elegans*, *Neuropteris*, *Sphenopteris*, *Pecopteris*, &c.; a pair of squirrels, born in captivity the third week in January last, of one caught last December; and a few specimens of larvæ, chrysalis, and moths. Mr. John Brooke, who exhibited the squirrels, remarked that they were about one month old before they could see. The birds reported to have been seen were the king-fisher on the 14th, swallow on the 15th, crested wren on the 20th, and the stone chat on the 24th. Eggs were exhibited of the song thrush, collected on the 3rd, missel thrush on 5th, blackbird on the 15th, starling, hedge sparrow, and robin on the 28th.—J. DEARDEN, Hon. Sec.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting May 1st, the president, Mr. G. T. Porritt, F.L.S., in the chair. Mr. Lister Peace exhibited a specimen of *Sigillaria* from sandstone, but the markings were not sufficiently distinct to determine the species. Messrs. Richard Jessop and John Armitage shewed an interesting series of botanical specimens, including all the British species of *Draba* except one; a very remarkable specimen of *Agraphis nutans*, originally from Hopton, having very long bracts, which appeared to be quite permanent, &c. The president exhibited the larvæ of *Acidalia degeneraria*, sent him by Mr. J. G. Ross, of Bath, who took the parent moth in the Isle of Portland. Mr. S. Bairstow shewed the larvæ of *Tryphaena fimbria*, from

Grimescar. Mr. George Brook, with the aid of the microscope, shewed mounted slides of *Orthosira arenaria*, a fossil diatom, and *Foraminifera*, from the Kent chalk. Mr. C. P. Hobkirk exhibited a sample plate of a book proposed to be published by Mr. W. C. Unwin, entitled "Illustrations and Dissections of the Genera of British Mosses," in ten monthly parts. The plate was very good. Mr. S. Bairstow read a very enjoyable paper on "Dame Nature and her doings." The subject must of necessity be general, and after a few introductory remarks, Mr. Bairstow attacked man from his own standpoint, avoiding as far as possible any discussion on the Darwinian hypothesis. He promised to complete the subject in two future papers, one on "Animals, Birds, and Fishes," the other on "Insects."

MEETING May 13th, the president in the chair. The chairman read a letter from Mr. Gilbert Wilson, steward to the Earl of Dartmouth, requesting the members to disturb the coverts at Woodsome as little as possible, until the first week in July, as the pheasants were now breeding. In geology, Mr. Sims Dyson exhibited a specimen of *Gryphæa incurva* from the lias limestone, found at Blackpool. Mr. Joseph Tindall shewed fossils from Middlestown of a species of *Cucullea*. Messrs. Joseph French and John Conacher shewed a nice series of botanical specimens, those of the latter included some aquatic species he had brought that day from

Glasgow. In lepidoptera, the president exhibited larvæ of *Epunda lutulenta* he had reared from eggs sent him by the Rev. P. H. Jennings, M.A., of Gravesend. Mr. Samuel Bairstow exhibited larvæ of *Scodiona belgiaria* from Norland moors. Mr. S. L. Mosley shewed beautifully-preserved larvæ of *Cossus ligniperda*, *Callimorpha dominula*, *Xylophasia rurea*, &c. Other general business having been transacted, Mr. C. H. Bould read a paper on "Mountain Limestone," in which he gave the result of his observations on this formation, made during excursions to Buxton, Lofthouse, Skipton, Malham, the High Peak, Pool's Cavern, Gowden Pot Hole, the Victoria Cave, at Settle, and other places in Derbyshire; illustrating his lecture with specimens of *Lithostrotion*, *Encrinites*, *Spirifera*, *Chert*, *Galena*, *Stalactite*, *Stalagmite*, *Producta gigantea*, &c. At its close a discussion ensued.

—GEORGE BROOK, Hon. Sec.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—207th Meeting, April 25th, 1876, S. Jefferson, F.C.S., president, in the chair. Mr. Edward Thompson read a paper entitled "A Year's Science," being a critical *resumé* of the Report of the Belfast meeting of the British Association.

208TH MEETING, May 2nd, 1876.—Mr. Fred. Coates, vice-president, in the chair. Mr. William exhibited a very numerous and fine series of fossil *Brachiopoda* from the Silurian formations near Dudley and Walsall, and other fossils from the tertiaries

of the Isle of Wight, and the post-tertiaries at Askern. Fossils and rock-specimens were exhibited by Messrs. S. A. Kennedy, James Malt, F. Coates, and B. Holgate. Microscopic specimens, including diatoms and insect-eggs, were shown by Messrs. Edward Thompson, S. Scholefield, and F. Emsley. Mr. W. E. Clark showed *Bombylius major*, taken on the 14th April, near Ingleton, hovering over a primrose. Notes on the birds of South Yorkshire by Mr. Thomas Lister, of Barnsley, on the birds of the Halifax district by Mr. F. G. S. Rawson, and some by Mr. W. H. Hay, of Leeds, were communicated.

209TH MEETING, May 9th, 1876.—The president, Mr. S. Jefferson, F.C.S., in the chair. Mr. James Irwin Coates, F.R.A.S., read a paper upon "The Roman Wall," of which the remains still exist in Cumberland and Northumberland; the paper was illustrated by a large series of carefully executed diagrams and by various objects of antiquity from the site. One vessel of great interest was sent for exhibition by Mr. John Holmes, of Methley. After which a discussion ensued.

210TH MEETING, May 16th, 1876.—The president in the chair. Mr. John Grassham exhibited a living Dormouse (*Myoxus avellanarius*), which he had recently captured in the Meanwood Valley. Mr. Edw. E. Prince showed three specimens alive of *Lophinus palmatus*, the palmated smooth newt, which differs from the common species in respect of the hinder feet being webbed;

these examples were from a small pond near Adel and Cookridge. He had not before known it in the Leeds district, but had about two or three years ago received specimens from Ilkley. Mr. J. Armitage exhibited *Vanessa Antiopa*, taken in August, 1875, at Burley, near Leeds. Mr. W. H. Hay showed nests of three and eggs of twenty-seven birds, all taken by him within a dozen miles from Leeds. Mr. C. H. Bothamley exhibited samples of the minerals cryolite and chalybite. The first is a double fluoride of sodium and aluminium, occurring in Greenland, with metamorphic rocks, and is one of the chief sources of aluminium. The second is carbonate of iron, with layers of haematite, the crystals showing the curved faces so characteristic of this and some other minerals crystallizing in rhombohedrons ; it is one of the purest iron ores. Mr. G. A. Kennedy showed a fine fossil tooth of *Rhizodus Hiberti*, a sauroid fish from the upper coal measures of Haddington. Mr. Edwin Birchall, F.L.S., sent specimens of *Scilla verna*, with the flowers of which the cliffs in the Isle of Man are blue at the present time. Mr. S. Scholefield showed newts ; also *Helleborus viridis*. Mr. Thomas Grassham showed *Saturnia carpini* in all its stages, from Adel Moor, and Mr. John Grassham—*Lasiocampa callunae* in various stages, and *Cicindela campestris*—from the same locality : Mr. J. Armitage, some exotic Lepidoptera, and the business terminated with the description of a geological excursion to Keighley, by Mr. Thos. Tate.—W.D.R.

OVENDEN NATURALISTS' SOCIETY.

—Monthly meeting, April 29th, the president, Mr. T. Robertshaw, in the chair. The botanical specimens collected by Messrs. C. Sheard, I. Binns, and W. Townsend included the following:—*Caltha palustris*, *Arum maculatum*, *Salix repens*, *Galeobdolon luteum*, *Lathraea squamaria*, *Myosotis palustris*, &c. Mr. R. Earnshaw exhibited a number of birds eggs, including great crested grebe *Podiceps cristatus*, cormorant *Carbo cormoranus*, shag *Carbo cristatus*, lesser tern *Sterna minuta*, razorbill *Alca torda*, lesser black-backed gull *Larus fuscus*, and woodchat shrike *Lanius rufus*. Mr. T. Hirst, a pair of Chinese golden pheasants, and a large collection of foreign birds and skins from America and Australia. Mr. J. Ogden exhibited and named a number of beetles, including sacred Egyptian beetle, pair of *Phanaeus lancifer*—beautiful specimens. Mr. T. Cockroft and Mr. I. Binns exhibited and named a number of geological specimens, including *Calamites cannaeformis*, *Sigillaria reniformis*, &c. Mr. R. Earnshaw and Mr. C. Sheard gave the dates of the arrival of the migratory birds, March 27th wheat-eat, April 19th lesser white-throat, 22nd swallow, house martin, chiffchaff, and redstart, 24th cuckoo, 29th whinchat and willow wren : owing to the recent cold weather the arrivals are a few days later than the last few years.

JOSEPH OGDEN, Hon. Sec.

RASTRICK AND BRIGHOUSE NATURALISTS' SOCIETY.—Meeting May 8th, the president, Mr. W. W. Turner, in the chair. The botanical specimens, one hundred and twenty-

five in number, and including most of the wild flowers of the month, which grow in the district, were named by Messrs. Moulton and Wentworth. Amongst the plants exhibited for the first time this year in bloom, were *Stellaria Holostea*, *Stellaria nemorum*, *Oxalis acetosella*, *Prunus Padus*, *Veronica Chamaedrys*, *Veronica montana*, *Primula veris*, and others. Mr. G. L. Lister exhibited and named a number of shells including *Lymnaea auricularia*, *Bulimus obscurus*, *Cyclas rivicola*, *Planorbis carinatus*, &c. A number of specimens of *Anthracosia*, from Low Moor, were also exhibited by Mr. Lister. Mr. Wentworth exhibited a curious red coloured bee, a colony of which had been discovered by himself and Messrs. Whately and Lister whilst out botanising. The bees were busy making their nests, which are situated in the ground, and resemble small mole hillocks.

SHEFFIELD NATURALISTS' CLUB.

—First excursion for the season, 29th April, to the romantic dell called Creswell Crags. Here they inspected the curious caverns which tradition says were used as hiding places by Robin Hood and his men. These caverns possess considerable interest for the paleontologist and the antiquary. Some members of the Club, after examining the breccia which fills up the floor of one of the caverns to a considerable height, gave way to the temptation, and seizing hammer and augur, with the loss of some perspiration, succeeded in detaching several fragments, among which were found embedded

a fine canine tooth of a powerful carnivorous animal, probably hyena or cave lion, an incisor apparently from the same jaw, teeth of a horse and of another herbivorous animal, and pieces of bone exhibiting marks of gnawing. But the most important finds were two flints of human manufacture, embedded in breccia containing bones, small fragments of charcoal, and water-worn pebbles. One of the flints is circular, and the other a long flake, of knife form. The traces of primæval man's occupation found in these caverns exhibit him in the lowest stages of barbarism. From Creswell Crags, several of the members proceeded to those beautiful bushy glens known as Markland Grips. The flora of the district does not appear particularly rich, but those flowers which are met with grow in great abundance. The three beautiful representatives of the genus *Primula*, i.e., *vulgaris veris*, and *elatior*, are exceedingly conspicuous, and *Lathraea squamaria*, and *Paris quadrifolia* are found near the rivulet.

STAINLAND NATURALISTS' SOCIETY.

—This Society held its monthly meeting at Burwood, Mr. S. Calvert in the chair.—Mr. W. Robinson read Mr. Wainwright's (the president of the West Riding Naturalists' Society) annual address delivered on Easter Monday, after which specimens were exhibited as follows: by C. C. Hanson: eggs of sparrow hawk, kestrel hawk, and rook; by J. Edwards: *Doronicum Pardalianches*, and others.—C. C. HANSON, Hon. Sec.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly Meeting May 4th, J. Wainwright, Esq., F.L.S., in the chair.—Mr. Walshaw exhibited a potato ball from the Bath oolite, found in a block of stone in building Christ Church, Thorne. Mr. Talbot: two male lesser red-poles. We wish to draw the attention of our botanical friends that there were no specimens in that department, and will be glad to hear from them.—J. SPURLING, Hon. Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—The usual monthly meeting of this Society was held on Wednesday evening, May 10th, Mr. C. D. Wolstenholme in the chair.—Mr. Simmons exhibited larvæ, very finely preserved, of *Setina irrorella*, *Noctua xanthographa*, and *Mania typica*, also *Lobophora lobulata*, and *Cucullia absinthii*; the chairman (Mr. Wolstenholme), eggs of Schintz's sandpiper (*Tringa Schintzii*) and Temminck's stint (*Tringa Temminchii*); Mr. T. W. Wilson, *Erythroxylon coco*, a plant from South America; Mr. Webster the following plants: *Alyssum calycinum*, and several forms of *Viola tricolor*; Mr. Helstrip, a fine pair of wrynecks (*Yunx torquilla*), also eggs of the same; Mr. Wm. Chapman, several fossils out of boulder clay from the east coast; the secretary (Mr. Prest), a series of *Eupithecia albipunctata*, also several black forms of that species, bred from larvæ taken at Bishop's Wood, Cawood, and a fine series of *Taeniocampa leucographa* from South Wales, and *Scotosia certata*, bred this season.

THE WEST RIDING CONSOLIDATED NATURALISTS' SOCIETY.—The second excursion of the season took place on Saturday afternoon, the 6th May. There was a large muster of members from the various local societies, and the district selected for investigation was Coxley Valley, a highly picturesque and most interesting hunting-ground. Tea was served in the Church School-room, at Middlestown, the members being waited upon by the ladies connected with the Naturalists' Society of that place. At 5 o'clock, the meeting was held in the same room, the president, Mr. Joseph Wainwright, F.L.S., in the chair. The Selby Naturalists' Society and the Huddersfield Literary and Scientific Society were unanimously admitted into the Union. The usual reports upon the collections made during the day were then read. Mr. Thomas Lister, of Barnsley, gave an account of the birds observed during the day, and also of the dates of arrival of the spring migrants in South Yorkshire. Mr. W. Talbot did the same for the Lower Calder Valley. The birds observed by him were the summer visitors—the redstart, whinchat, grasshopper warbler, sedge warbler, blackcap, garden warbler, whitethroat, lesser whitethroat, wood warbler, willow warbler, chiff-chaff, tree pipit, Ray's wagtail, cuckoo, swallow, martin, and sand martin; of resident birds,—the missel thrush, song thrush, blackbird, hedge accentor, red-breast, greater tit, blue tit, marsh tit, long-tailed tit, pied wagtail, meadow pipit, skylark, bunting, blackheaded bunting, yellow bun-

ting, chaffinch, tree sparrow, house sparrow, greenfinch, lesser redpole, starling, carrion crow, rook, magpie, jay, creeper, wren (and nest), ring-dove, pewitt, and common sand piper ; and in addition to these, he had seen a flock of fieldfares, very late for these winter visitors to remain in the district. These notes were supplemented by Mr. C. C. Hanson, of Stainland. Mr. G. T. Porritt, F.L.S., on being requested to report upon the Lepidoptera, said that in consequence of the cold winds which had prevailed for some time previously, but few had been taken. Several butterflies were observed, the best being *Vanessa polychloros* ; larvæ of *Chelonia caja* plentiful on nettles about Middlestown. Mr. George Jackson, of Netherton, exhibited the specimen of *Catocala Fraxini* he took at Bulcliffe Wood, in the immediate neighbourhood, on the 12th August, last year—a very nice specimen (see *Naturalist*, vol. i, p. 46.) The plants were reported upon by Mr. Richard Jessop, of Lascelles Hall, and included the following :—*Ranunculus hederaceus*, *Caltha palustris*, *Draba verna*, *Viola sylvatica*, var. *Riviniana*, *Viola tricolor*, *Ulex Europaeus*, *Orobus tuberosus*, *Oenanthe crocata*, *Angelica sylvestris*, *Adoxa moschatellina*, *Fedia olitoria*, *Petasites vulgaris*, *Plantago media*, *Glechoma hederacea*, *Veronica hederifolia*, *Lamium purpureum*, *Ajuga reptans*, *Primula vulgaris*, *Orchis mascula*, and *Arum maculatum*. *Fontinalis antipyretica* was the only moss shown. Mr. Joseph Tindall, of Huddersfield, in describing the geological structure of the Horbury

district, which included Coxley Valley and Middlestown, said that the district lies upon the Thornhill and Dewsbury rock, which forms the bold escarpments of Thornhill edge and Earlsheaton, and including the Haigh-moor coal, from 2 to 4 feet, with the accompanying shales and sandstones, and the beds of coal known as Joans, Mitchell, or Parsons coal, and the shales of sandstones connected with them, making together strata about 398 feet thick. Below these are the Flockton thick or Adwalton stone-coal, 1 to 3 feet, divided by shales and sandstones 57 feet thick ; from the "Flockton thin, Dewsbury-bank, yard, or Adwalton," black bed coal. Underneath are the old-hards, brown-metal, green-lane, or Middleton little coal ; new-hards, Cromwell - main, Wheatley - lime, blocking, and Cookson coals ; altogether forming strata 612 feet thick, worked in the district. Amongst the fossils are found—*Lepidodendron Harcourtii*, *L. elegans* and two other species, *Calamites approximatus*, *C. Cannæformis*, *Sigillaria pachyderma*, *S. lœvigata*, *S. oculata*, *S. tesselata*, *S. reniformis*, *S. organum*, *Stigmaria ficoides*, *Anthracosia robusta*, and *Cucullea*, in beds 8 inches thick. *Sphenopteris linearis* and other fossil ferns were exhibited from the Shelly Railway tunnel and Flockton.—W. D. R.

ERRATA.—Page 151, delete last par. under "Birds of Wakefield." Page 156, line 19, 2nd col., for *Dodona* read *Dadoxylon*. Page 157, line 16 from bottom, 1st col., for *alternum* read *alternans*.

Diary.—Meetings of Societies.

- June 1. Wakefield.
,, 3. Ovenden Naturalists'—Excursion to Luddenden Valley.
Clayton West, Mirfield, Paddock.
,, 5. West Riding Consolidated Naturalists'—Excursion to Askern ; Meeting at White Swan Inn, at 4 p.m.
,, 6. Liversedge.
,, 7. Holmfirth.
,, 10. Huddersfield Naturalists': Paper, "Species are increasing, and have continued to increase since life commenced on our Globe."—Mr. Joseph Tindall.
Ripponden, Honley, Middlestown.
,, 12. Rastrick.
,, 13. Leeds Naturalists' Club: Paper on "*Protococcus pluvialis*," by Mr. Thomas Hick, B.A., B. Sc. Bradford.
,, 14. York.
,, 17. Paddock.
,, 20. Leeds, Selby, North Staffordshire Field Club—Excursion to Alton and Oakamoor. Zoological Society of London.
,, 24. Heckmondwike, Ovenden, Honley.
,, 26. Huddersfield: Paper, "Iron Pyrites, its Mineral characters and economic applications."—Mr. George Jarman.
,, 27. Leeds, Bradford.

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JULY, 1876.

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FIVE DAYS IN EAST SUSSEX.

By G. T. PORRITT, F.L.S.

ON the morning of Monday, the 29th of May last, I left home for the purpose of having a few days' collecting in the South. The Rev. T. W. Daltry, M.A., F.L.S., of Madeley Vicarage, Mr. W. H. Tugwell, of Greenwich, and myself, had previously arranged to do so; and as we had last year worked a locality in North Kent, we determined to change the county, and fixed on Abbott's Wood, near Hailsham, as the ground for this year. Reaching Victoria Station, London, I had some dinner, after which I took a stroll on the platform, and met Mr. Daltry shortly before two o'clock, which was the time for the departure of the train for Hailsham. In the "change of trains" at Polegate, we were joined by Mr. Tugwell, whose train had been attached to ours higher up the line. A run of ten minutes or so then brought us to our destination, and we were soon settled in comfortable lodgings.

Having had some refreshment and unpacked our "traps," we were very anxious to see our ground, though (thanks to Mr. Tugwell, who had worked it several times before, and who seemed to know every yard of it) we had already become pretty well aware of its character; still, though we knew it was perhaps almost as good a locality as could be found in Britain at that season of the year, we were by no means sanguine as to the result of our expedition, as during the whole of May we had had almost a continual succession of cold east winds, and these certainly are never very conducive to the development of insect life. How our fears were realised will be best judged by a perusal of our "doings."

A walk of twenty minutes or so from our lodgings brought us to the wood, in the "rides" of which, beating stick in one hand and net in the other, we were soon at work. Hornbeam forms the principal feature of the wood (botanically), and as the species which had been one of the greatest inducements to me to visit the district, feeds in its larva state on its leaves, we thrashed the bushes with a will, and were before long rewarded by seeing the pretty little *Agrotera nemoralis*, the object of our search, dart out with a short but quick flight. It was by no means common, however, indeed Mr. Tugwell said it

was very scarce compared with the number he took last year ; and we soon found out that if we each intended to get a tolerable series we should have to work pretty closely.

Almost immediately on entering the wood, a specimen of the somewhat rare *Eupithecia dodoneata* fell to my net, so we were in high hopes we should manage to secure a fair number of it during our stay ; in this, however, we were disappointed, as we did not meet with a second. Another "Pug," *E. plumbeolata*, turned up directly after *dodoneata*, and this proved to be very common, becoming more so every day we were there. As might have been expected, the hornbeam produced the neat little *Asthenia candidata* in abundance ; it proved indeed to be the commonest Geometer on the wing, although in some parts *Acidalia remutata* was nearly as numerous. *Herminia barbalis*, too, one of the *Deltoids*, was so plentiful as to become almost a nuisance, though many of the specimens were so beautifully fine, we could not help taking them. Amongst other species beaten out in more or less abundance were, *Tephrosia consonaria*, *Iodis lactearia*, *Ephyra porata* and *pendularia*, *Numeria pulveraria*, *Cidaria corylata* and *russata*, *Botys pandalis* and *fusca'is*, &c.

As evening advanced we put on the sugar, a supply of which each of us had not neglected to bring ; although as the atmosphere had become very cold and clear, with the moon shining brightly, we did not anticipate much success. The result proved our surmises correct, as, although each had taken a different "ride," very few moths indeed were tempted to regale themselves upon the "seductive sweets." Amongst the few that did come, however, were several *Lithosia aureola*, in most perfect condition, with *Acronycta auricoma*, a few *Xylophasia rurea*, including the variety *combusta*, *Apamea unanimitis*, *Hadena genistæ*, and very strongly marked *Thalassina*, *Erastria fuscula* in fine order, and a few liberated *Gonoptera libatrix*. After two rounds at the trees we were quite contented to leave them to the peaceful possession of any *Noctuæ* that might feel disposed to avail themselves of the privilege. Just at dusk we had taken *Nemoralis*, on the wing ; also the delicate *Acidalia subsericeata*, evidently just out. The last thing, whilst waiting for our companions to come up, we searched the grass and collected from it a few evidently full-grown larvæ of the striking "marbled white" butterfly, *Arge Galathea*, and thus ended our first evening in Abbott's Wood.

Next morning turned out all a lepidopterist could desire, the sun shone brightly, the atmosphere was very warm, but not so hot as to be

uncomfortable ; so, having "set" our previous day's captures, we again set out for the wood in high spirits, hoping to enjoy good sport amongst the "day flyers." We were not disappointed, for lepidoptera in great variety were abundant, the contrast to our barren northern woods at this season being most marked. Of butterflies the bright *Argynnis Euphrosyne* was common, whilst its close relative *Selene* was flying in profusion, crossing our paths everywhere ; both species showed a decided partiality for the flowers of *Ajuga reptans*, as many as four sometimes being on a single flower. Hibernated, and consequently tattered, *Gonepteryx rhamni* were common and flew wildly about, evidently considering it was high time their eggs were deposited on the sloe and blackthorn bushes. *Satyrus Megæra*, too, was numerous as also *Syrichthus alveolus*, not to mention *Chortobius pamphilus* and *Polyommatus Phœas* ; one or two of the *Hesperiadæ* were "skipping" about, but they were evidently not yet well out. Of the *Nocturni*, the "wood tiger," *Chelonia plantaginis* gambolled about rather commonly, and became more plentiful every day (nearly three weeks earlier than it would be out here) : the "cream spot," *Chelonia villica*, flew grandly in the hottest sun, the first specimen, a large female, almost startling me as it rose up, and shewed off its brilliant colours to perfection ; *Lithosia aureola* was beaten out and taken on the wing pretty frequently ; and large nests of young *Bombyx neustria* larvæ were observable on the sloe and other shrubs. *Geometræ* were well represented ; in addition to the species taken the previous afternoon, we got *Epione advenaria*, some worn, others very good ; the pretty *Venila maculata* abounded in perfect order ; *Tephrosia punctulata* and *Ephyra pendularia* were more or less worn, whilst *E. porata* was in all sorts of conditions. *Strenia clathrata*, *Aspilates striolaria*, and *Coremia ferrugata* were in fair order, but *Panagra petraria* was poor. *Anaitis plagiata* was fine, and being common, gave us some good chases in the sun ; and *Coremia temerata* was also good. *Fidonia atomaria* surprised me considerably, the males being very much larger than our northern specimens, the females also large, and of the same colour as the male, whilst ours of that sex have the ground colour white. Of the small order, *Drepanulæ*, *Platypteryx lacertula*, and *falcula* occurred ; whilst of *Noctuæ* a brood of *Tæniocampa miniosa* was found on an oak by Mr. Daltry ; that of *Cymatophora flavidornis* occurred on birch ; with *Tæniocampa cruda* &c., on sallow. In the imago state *Phytenetra œnea* skipped about in the clearings, but it was the sole representative of its order. Of *Pyræles*, besides *Nemoraliæ*

the black-and-white *Ennychia octomaculalis* was spinning about the low herbage, as was also *Pyrausta ostrinalis* &c., &c. Amongst other "sun loving specimens" on this day, a large viper fell a victim to Mr. Tugwell's stick ; these reptiles were no doubt very common, but they managed to keep pretty well out of our way. In the evening we were joined by Mr. Herbert Goss, of Brighton, and Mr. Grimes, a local lepidopterist, and again sugared, in another part of the wood, but with no better fortune than on the previous night, indeed rather worse ; amongst the species taken on the wing however was a good female specimen of the local *Ephyra orbicularia*, by Mr. Tugwell.

Next day, Wednesday, we again went to the wood, and took most of the species mentioned for Tuesday, including more *Nemoralis* and *Aureola*. Amongst fresh species observed were *Vanessa polychloros*, *Io* and *Cardui*, no doubt all hibernated, *Orgyia pudibunda*, *Ephyra omicronaria*, not uncommon amongst maple, the pretty but common *Lomas-pilis magnata*, *Lobophora hexapterata*, on boles of aspen ; a fine *Platypteryx hamula* by Mr. Daltry ; *Macrogossa fuciformis* by Mr. Goss, &c. *Emmelesia affinitata* was also taken on this or the previous day. In the wood a boy had just caught a fine specimen of the dormouse (*Myoxus avellarius*) which I brought home with me, and which is now under the tender guardianship of Mr. James Varley. We sugared again in the evening, but no fresh species came to the trees. In the larva state, however, *Poecilocampa populi* was found on willow, and the plump caterpillar of *Amphypira pyramidea* with *Agriopsis Aprilina* were also noticed. This was a beautifully clear moonlight night, and nightingales (*Philomela Luscinia*) were in full song on all hands. I counted five or six singing at one time from my "ride." As we walked to our lodgings after our "work" too, we generally heard the peculiar song of the grasshopper warbler (*Salicaria locustella*).

Next day we felt inclined to vary our work, so took train as far as Polegate, and from thence walked over the Downs to Eastbourne. A lovelier day, or a more enjoyable walk could not have been wished for, the tramp over the extensive white chalk hills, and the breeze from the sea were most exhilarating. We noticed very few lepidoptera, however. The pretty *Anthocharis cardamines* was frequent in the lanes, *Eubolia lineolata* was common and very fine, and *Pyrausta ostrinalis* with *Herbula cespitalis* were dancing about in numbers, but little else. My friends contented themselves with botanizing, and some very good plants were noticed, including the local *Cineraria*

campestris not unfrequently ; the pretty *Orchis ustulata* was also common. On nearing Eastbourne an extensive piece of waste ground, overgrown with the white campion *Lychnis* yielded some *Strenia clathrata* ; we could not help thinking what a fine spot it would be for the *Dianthæciæ* in the evening, or for their larvæ in the Autumn. On Beachy Head we were pleased to find the lovely "Blue," *Lycœna Adonis* tolerably common, though evidently only just getting well out. *Crambus chrysonuchellus* occurred on the same spot. An immense field of saintfoin was "alive" with the pretty but common *Lycœna Alexis*, there were hundreds upon hundreds of them flitting about everywhere. "Hereby hangs a tale," which for our Entomological credits' sake had better not be divulged !

Next day we visited the wood, and again filled our boxes with a large assortment of insects, mostly of course species we had taken on our previous visits ; in addition however *Nola cristulalis* occurred, and the beautiful *Melanippe hastata* was flying over the birches, Mr. Tugwell was fortunate enough to find a lot of larvæ of the local *Tethea retusa* along with those of *Epunda viminalis* on sallow. The larvæ of these two species are very similar, but that of *Retusa* may be distinguished from its having a black or dark coloured head, whilst the head of *Viminalis* is nearly white. The fine larva of *Lasiocampa quercifolia* was also taken this day ; and those of *Odonestes potatoria* were noticed on the grass. Whilst beating the bushes a bird flew out of the underwood close to Mr. Daltry's feet, when a search soon revealed the nest and five pretty olive eggs of the nightingale (*Philomela luscinia*) ; the nest was composed almost entirely of dead oak and beech leaves. It generally took us about four hours to work through the wood, by which time we were ready to avail ourselves of the advantages of a "Pub" which was situated "conveniently" at the far end. Here we spent about twenty minutes comparing notes and captures, over our bread and cheese and beer, some of our party even deeming a "smoke" still more refreshing ! After this we always worked homewards. About six o'clock this day the first rain we had had since we left home, fell, and the moon being overcast at night more insects were taken at sugar than on any previous evening, though the only additional species to those already taken were *Acronycta leporina* and *Aceris*. The beautiful *Diphthera Orion* was a plentiful visitor to the trees last year, but this week we laid our bait for it in vain ; probably it was not yet out.

Next morning, Saturday, Mr. Daltry and I most reluctantly left

Hailsham by an early train for London, leaving Mr. Tugwell to another week's collecting.

The district is well wooded and would doubtless produce numbers of good species at almost any part of the year: in the limited time we had, it was impossible to pay any attention to larvæ, or unquestionably our list would have been greatly increased. As it was we had taken over a hundred species, exclusive of Micro-lepidoptera, and this we thought was tolerable, considering the earliness of the season, and the previous wretched weather.

The botanical treasures of the district are numerous, we were told, but knowing little of that science myself, I shall decline enumerating species; suffice it to say we gathered some fine specimens of *Phyteuma spicata* on our way from the wood to our lodgings. Hailsham itself is a charming little village, which every visitor to Eastbourne ought to make a point of seeing.

June 16th: I have just received a letter from Mr. Tugwell containing report of what he did after we left. Sugar proved more productive, *H. Genistæ* being more numerous, and *L. Aureola* coming pretty freely, forty to fifty on one night; half a dozen *Aplecta herbida* in splendid condition, and *D. Orion* at length appeared.

Huddersfield, June 15th, 1876.

GEOLOGY OF THE HALIFAX HARD BED COAL.

By J. SPENCER.

(Continued from page 164.)

OVERLYING the "baum pot" bed, there is a bed of very fine black shale which yields several species that appear to be peculiar to it. The whole of marine strata appear to have been formed in one continuous epoch, but the three beds just described, mark so many separate stages in that epoch. The marine character of the shells, of which I have myself found some 50 or 60 species, teach us that during the time these strata were forming the sea covered all this part of the country. We know also that then the great Pennine Chain which separates us from Lancashire, did not exist. It is not often that geologists indulge in speculations about the length of time requisite for the formation of any particular set of strata, but the facts in connection with the marine beds are so interesting that the late Professor

Phillips made the attempt. The least number of years that this extremely cautious geologist could arrive at was 5,000 years. To those who have not studied the question in all its bearings this may seem a very large estimate for these few feet of strata. But when we come to consider that the Cephalopoda, to which class our *Goniatites*, *Nautili*, and *Orthoceras* belong, enjoy long life, and take into consideration their enormous numbers of all sizes, from microscopic forms to others large as the pearly *Nautilus*, representing the spreading of the family over a great part of England, and the birth, growth, and decay of untold generations, I think we must come to the conclusion that 5,000 years is within the mark. All the species which occur in these beds are found also in the millstone grit, the Yoredale and the mountain limestone strata. The mountain limestone is undoubtedly a deep sea deposit, and all the animal remains found in it belonged to species which lived in the sea in which that rock was deposited. In the Yoredale rocks there is a succession of beds of limestone having the same kind of fossils, but intercalated amongst them there are other beds having a somewhat different class of fossils which indicate estuary deposits. The change is still further carried on in the millstone grit rocks where the limestone deposits become both rarer and thinner, and at length in those marine deposits overlying the hard bed coal, we have the last appearance of those calcareous deposits which form such a conspicuous feature of the early carboniferous rocks. Now the question might be reasonably asked, "How is it that these marine strata are not grouped with the millstone grit strata, rather than with the coal-measures, seeing that they are so naturally tied together by their fossils?" Well, in the first place, the rough rock is regarded by the universal consent of geologists as the uppermost member of the millstone grit rocks, this conclusion having been arrived at by a thorough examination of all the facts bearing on the case. And in the next place, as the late Professor Phillips long ago observed, "An examination of the neighbourhood of Halifax has shown another order of phenomena, and another set of shells which connect this same series with the upper or true coal-measures. In the upper coal series of Northumberland, Derbyshire, and Yorkshire, are several layers of bivalve shells, commonly referred to the genus *Unio*, from which the freshwater origin of these coal deposits has been inferred. No shells of this kind have ever been met with in the mountain limestone group, which there is every reason to consider as of decidedly marine origin; not

one of all the zoophytic, testaceous, or crustaceous reliquiæ of this limestone has ever been found in the upper coal series." It is a very interesting fact, and worthy of special note, that the first appearance of the shells, formerly called *Unio*, but now termed *Anthracosia*, in the carboniferous rocks of this neighbourhood, occur in a thin layer just under the soft bed coal. A few feet above that coal, there are three separate beds which yield them in vast abundance. I have also met with a very small univalve shell in the same beds, called *Spirorbis carbonaris*, or little coiled shell of the coal-measures. Both these shells occur in the middle coal-measures in prodigious numbers. Once, while geologising at Low Moor, I found a little colony of the beautiful *Spirorbis*, on the trunk of a large *Sigillaria*, just brought up to the surface, which were so perfect that at first I mistook them for recent shells, and so lightly were they attached to the fossil plant that they fell off while I was breaking it into a portable size. It is interesting to note how a simple fact like this serves to illustrate the condition of things in the old coal measure era, and how it proves that the laws of Nature were then pretty much the same as now. The *Sigillaria*, which was undoubtedly a land plant, appears to have been uprooted or broken down by a storm or some other cause, and then to have been carried into the estuary or lake, where the colony of shells took possession of it. Then it became after a time water-logged, and sank to the bottom, carrying its living freight with it, to become entombed in their muddy graves. I need scarcely say that incidents of this kind are of frequent occurrence in all our large rivers and estuaries.

There are many other interesting facts in connection with these strata which time will not permit me to dwell upon at present, all of which bear evidence of great changes in physical geography, having occurred in the period represented by the strata about our hard and soft bed coals. In concluding this part of my subject, I will briefly summarise some of the changes in the level of the sea and land, which the succession of these strata plainly teach us. First, we may begin with the soft bed coal, which represents an ancient land surface upon which the vegetation which formed that coal grew, then that land slowly sunk below the level of a great estuary or lake, in which vast numbers of fresh-water shells lived and died, generation after generation, leaving their remains to form the "unio beds"; then again the land rose out of the water, and was covered by the plants which formed the middle band coal. Again the land sank beneath the

water and was covered by strata 12 yards in thickness, after which it arose once more and became overspread by the vegetation which formed the hard-bed coal. How long it remained a land surface we cannot say, but there is much evidence to show that this time was of great duration. Once more the land slowly sank beneath the waters, this time being covered by a deep blue sea in which myriads of marine animals disported themselves, conspicuous among them being the *Nautilus* and *Goniatites*, which swarmed in countless millions and decked in all the wealth of form and colour which those beautiful shells were endowed with. Great and manifold as the facts undoubtedly are which I have brought before you, which the study of the strata enveloping the hard bed coal has revealed to us concerning the history of the period when these rocks were forming, yet we are only on the threshold of the knowledge which they are capable of affording us, for the study of the contents of the round balls obtained from the hard bed coal itself is, if possible, still more important and interesting.

(To be continued.)

Short Notes and Queries.

DEATH OF MR. EDWARD NEWMAN.—Death has lately made sad havoc amongst the devotees to entomology, but since the loss of Henry Doubleday, none will be received with such wide spread regret, as that of Edward Newman, Editor of the “*Zoologist*,” and “*Entomologist*”; author of the “*Illustrated British Butterflies and Moths*;” and other ornithological and entomological works. Mr. Newman died on the 12th instant from the effects of stricture, and afterwards pyæmia. He was formerly President of the London Entomological Society, was a Fellow of the Linnean and Zoological Societies, as well as of various Continental and Scientific Associations. For many years he was the close friend of the late Henry Doubleday, and was known throughout the whole Entomological and Ornithological world. He was an occasional correspondent of my own for a number of years.—GEO. T. PORRITT.

June 16th, 1876.

***Acronycta alni* AT ROTHERHAM.**—I beat a good specimen of *Acronycta alni* out of a birch tree last Tuesday.—JAMES BLOOR.

Rotherham, June 18th, 1876.

REDWING.—I was recently shown by Mr. T. Machen, a very intelligent observer, a pair of redwings, which had been shot at Bridlington in the summer-time. Unfortunately the date was not written down at the time, and is now forgotten, but the period of the year is most unusual, as you are aware.—J. H. GURNEY, JUN., Northrepps, Norwich.

THE GREAT AUK.—You may like to print the following extract from W. Bulloch's guide to the London Museum, referring as it does to the only British-killed specimen of the Great Auk in existence. It is from the guide 1814, not of course from the larger edition of 1813. “*The Great Auk, or Northern Penguin. (Alca impennis.)* Of this rare and noble bird, we have no account of any having been killed on the shores of Britain, except this specimen, for upwards of one hundred years. It was taken at Papa Westra, in Orkney, to the rocks of which it had resorted for several years, in the summer of 1813, and was finely preserved and sent to me by Miss Trail, of that island, a lady to whom I am under considerable obligation for securing me many valuable and rare subjects from the Northern Isles, and much interesting information respecting their habits. I had the pleasure of examining this curious bird on its native element; it is wholly incapable of flight, but so expert a diver, that every effort to shoot it was ineffectual.” The above extract occurs at p. 75, in a short catalogue of birds in separate cases. This Great Auk is in the British Museum.—J. H. GURNEY, JUN., Northrepps, Norwich.

PEREGRINE FALCON IN YORKSHIRE.—It may interest your readers to know that the noble peregrine has once more made its nest and hatched its young in Yorkshire. During Whitsun-week I was spending a few days at Bridlington, and being on the look out for eggs, I went about amongst the dealers and collectors. I heard that the climbers who gather the eggs had taken three young peregrines. As early as possible I started off to find the climbers and see the birds. I found the men just returning from one of their climbs and learned the following particulars. In the spring of 1875, they had noticed a peregrine falcon in the neighbourhood, and this season they noticed a pair, they therefore were on the look out for the nest as they had some very tempting prices offered for the eggs; during the last week in May they found the nest containing three young birds on the Bempton Cliffs, which are three or four miles north of Flambro' Head, they took the birds and they are now in my possession, two males and one female; the female is fully one-third larger than the males, and not quite so forward in feather. It is many years since these birds were known to breed here before. There are only about four varieties of sea birds breeding in this immediate neighbourhood. Most plentifully and that in great numbers is the common guillemot, or as the natives call it skout. Next in numbers the razor-bill, the puffin or parrot, but the eggs are often difficult to get at, as they are deposited in holes or fissures of the rock. There are also a few kittawakes breed here. The breeding place ranges from Flambro' Head to Speeton. I procured some very beautiful and uncommon varieties of eggs, both of the guillimot and the razor-bills. The birds have very greatly increased in numbers since “The Sea Birds' Protection Act” came into operation.—Wm. JAS. COPE.

Barnsley, 20th June, 1876.

THE RAINFALL OF MAY.—May is usually the driest month in the year, the ten years' average fall being 1.91 in. ; but the amount this year is only 1.05 in., making the total so far for 1876 11.26 in., against an average of 12.02 in. The rainy days have only been 8 instead of 12. During 24 days the winds have been N W, N, N E, and E, and the month has been in consequence cold and ungenial.—J. W. ROBSON.

Dalton, 7th June, 1876.

DISCOVERY OF THE LARVA OF *Nola albulalis*.—Mr. J. P. Barrett, of Peckham, was fortunate enough to find the larva of this interesting species, on Wednesday last, the 7th inst., on the spot in Kent where I and others took so many of the imagos two years ago. Through the kindness of Mr. Barrett, I have received a supply to-day, and find three varieties, the first delicate pale yellowish green, marked with black ; the next bright orange, marked with black ; and the other somewhat intermediate between the two. Full descriptions will appear in the Entomological journals, so soon as the imagos are bred from them. Bramble is the food plant.—GEO. T. PORRITT.

Huddersfield, June 13th, 1876.

We are glad to learn that our friend and correspondent, Mr. J. H. Gurney, Jun., has in the press a work which is nearly ready, entitled “Rambles of a Naturalist in Egypt and other Countries.” Of course we cannot speak of its merits before having seen it : but from the well-known labours of its author, we feel confident it will be an interesting one to naturalists generally. The rambles are not confined to foreign shores, but will include several chapters in British Ornithology, and also on the claims of the spotted sandpiper as a British (and Yorkshire) bird. The book will be published by Messrs. Jarrold & Sons, of London, and is promised for early in August.—[Eds. Nat.]

CRATAEGUS LACINIATUS Ster.—Mr. Isaac Picton has forwarded a specimen of *Crataegus* from near Warrington, which is clearly the form described in my paper on this genus in 1866, as *C. laciniatus*. It differs from the ordinary forms *oxyacanthoides* and *monogyna*, the latter of which it most nearly resembles in having the lobes of the leaves cut down quite to the midrib, indeed almost pinnate, and glabrous on both sides except occasionally somewhat ciliate on the edges near the base.—C. P. HOBKIRK.

Reports of Societies.

BRADFORD NATURALISTS' SOCIETY—The president, Mr. E. Margerison, in the chair.—The meeting

was devoted to conversation and exhibition of specimens, of which there was a large number on the tables. Amongst them were *Myosotis sylvatica*, *Viola palustris*, *Cardamine amara* and *Arctia Mendica*,

&c. There was also a living specimen of the common hedgehog. The chairman read an article from the *Yorkshire Post* on her Majesty's ship "Challenger," and the deep sea exploration. Mr. T. Roebuck read an interesting paper on "Flowers." — J. W. W. BROOK, Hon. Sec.

HECKMONDWIKE NATURALISTS' SOCIETY.—Meeting 27th May, Mr. J. M. Barber, vice-president, in the chair.—A fine collection of plants from Wensleydale was exhibited and named by Mr. Robert Smith; a live scorpion by Mr. W. Cardingley, found amongst some logwood from Honduras; and some recently formed conglomerate from Scarborough, by Mr. John Norcliffe. There were also exhibited some fossils and minerals, and a few local plants.—J. DEARDEN, Hon. Sec.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting June 10th, the president, Mr. G. T. Porritt, F.L.S., in the chair.—The specimens exhibited were numerous, and included in geology an example of *Ammonites splendens* from Cambridgeshire, by Mr. Joseph Tindall; *Rhynchonella* and a *Producta* from mountain limestone by Mr. Henry Mackenzie. In botany, *Cineraria campestris* and *Phyteuma spicata* collected by the president the week previous, the former on the Downs near Eastbourne, and the latter at Hailsham, in Sussex; the following amongst many others from Malham, by Messrs. Lister Peace and George Whitwam:—*Geum in-*

termedium and *rivale*, *Viola lutea*, *Ophrys muscifera*, *Saxifraga tridactylites* and *granulata*, *Draba incana*, *Geranium lucidum*, *Primula farinosa*, *Cystopteris fragilis*, &c. Mr. John Robinson exhibited a nice collection from Askern; Messrs. C. H. Bould and Allan Godward, local specimens; and Mr. Henry McKenzie a number from Millersdale. Mr. Joseph French laid on the table a remarkable monstrosity of *Bellis perennis*, having a number of peduncles grown together. The president showed a beautiful living dormouse, brought from Abbott's Wood, Sussex. In ornithology, Mr. James Varley shewed a living tawny owl (*Syrnium aluco*) he had taken from a nest at Middle Gelt Bridge, Cumberland, on May 29th; a nest and eggs of the nightingale (*Philomela luscinia*) from Abbott's Wood, by the president; and an egg of the common sandpiper (*Totanus hypoleuca*), found on Marsden moors by Mr. J. R. Dore. Mr. Joseph Tindall read a paper entitled "Species are increasing, and have continued to increase since the commencement of life on the globe." The paper was a reply to one on the same subject by Mr. Nettleton some weeks ago, and the lecturer drew his arguments solely from the geological aspect of the question, and principally from the distribution in the various strata of known fossil remains. A discussion followed. — GEORGE BROOK, Hon. Sec.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION—211th Meeting, May 23rd, Mr. H.

Pocklington, F.R.M.S., vice-president in the chair. Mr. W. Nelson read a paper on "The desirability of our forming local collections," which gave rise to a good discussion, most of the speakers seeming to coincide with Mr. Nelson's views.

212TH MEETING, May 30th, Mr. Samuel Jefferson, F.C.S., president, in the chair. Mr. Fredk. Greenwood, Curator of the Leeds Medical School, exhibited a splendidly executed series of dissections of the common black slug. He also showed *Orchis ustulata* in flower, from Wetherby. Mr. Henry Crowther, of the Philosophical Museum, exhibited a large dog-fish (*Scyllium canicula*, also its egg-pouch; the nest of a tree-wasp; and the nest of the long-tailed tit. Mr. W. H. Hay showed the eggs of the wren and willow wren from Scarcroft. Mr. Chas. H. Bothamley exhibited *Rhynchonella tetrahedra* and *Cardium truncatum* from the middle Lias, and specimens of the Permian limestone from Pontefract, showing the cavities and enclosed crystals. Under the microscope the president showed various Rotifers alive, *Brachionus*, *Hydatinae*, and *Rotifer vulgaris*). Fossils, plants, and insects, were shown by Mr. R. Milestone, C. Smethurst, and S. Scholefield.

213TH MEETING, June 13th, the president in the chair. Mr. Thomas Hick, B.A., B.Sc., gave a paper on "*Protococcus pluvialis*," illustrated by living examples. Mr. Chas. Smethurst showed larvæ of *Thecla quercus* and *Orygia gonostigma*, and a plant which Mr. F. Arnold Lees, F.L.S., named *Rumex alpinus*,

Monks' Rhubarb, naturalized near Cookridge Hall, near Leeds.—W. D. R.

LIVERSEDGE NATURALISTS' SOCIETY.—Monthly meeting June 13th, the president, the Rev. W. Fowler, in the chair.—Some unusually large *Calamites* from excavations for cellars at Liversedge Hall were exhibited by Mr. Rothery, and several plants were laid on the table, the most interesting ones being *Orchis Morio*, from Whitley, *Cardamine amara*, from Heath, near Wakefield, and *Fumaria claviculata*, *Luzula multiflora*, and *Empetrum nigrum*, from Brimham rocks, near Pateley Bridge. The president made some remarks on the disintegration of rocks by the atmosphere, frost, and rain, illustrating them by the exhibition in the microscope of a piece of old stained glass, which (through long exposure to the above agencies) had undergone "denudation," and become almost a model of the strata in certain parts of England.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting May 27th, Mr. R. Earnshaw, V.P., in the chair. Amongst the botanical specimens collected by Messrs. C. Sheard, R. Earnshaw, T. Scott, and W. Townsend, were *Botrychium lunaria*, *Ophioglossum vulgatum*, *Polyodium Dryopteris*, *Polygala vulgaris*, *Pedicularis sylvatica*, *Orchis mascula*, *Veronica montana*, *Lychnis diurna*, *Pimpinella saxifraga*, also a number of botanical specimens sent from Lincolnshire by the president, Mr. T. Robertshaw, who

also sent a number of entomological specimens, which were exhibited and named by Mr. J. Ogden. Mr. R. Earnshaw exhibited a number of birds' eggs, including curlew, coot, and sheldrake ; Mr. T. Hirst a number of British and foreign birds, including curlew, sandpiper, golden plovers, and a sky-lark eleven years old, in very good feather, pair of sun birds, and a pair of scarlet-crested humming birds.

RAMBLE and Meeting June 3rd, to Luddenden Valley, from Booth to Low Bridge, and a portion of Warley Moor on the north side of the valley. Mr. R. Earnshaw, V.P., presided at the meeting afterwards. Amongst the botanical specimens collected during the day were *Paris quadrifolia*, *Drosera rotundifolia*, *Listera orata*, *Pinguicula vulgaris*, *Viola lutea*, *Viola palustris*, and a large number of others common to the district. Mr. J. Spencer described the geological formation of the district.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly meeting June 1st, the president, J. Wainwright, Esq. F.L.S. in the chair.—Mr. Hall exhibited eggs of the redstart, lesser redpole, bullfinch and whitethroat ; Mr. Wormald eggs of lesser redpole, sedge warbler, and chiff-chaff ; Mr. G. H. Lumb, eggs of grasshopper warbler ; Mr. J. Wilcock, eggs of the tree sparrow and several nests. The president then gave an interesting account of a day's visit to Kew Gardens. He exhibited specimens of *Zygophyllum Fabiaceæ*,

remarkable for the hardness of the wood, also its exciting properties, the foliage being very deterersive, frequently used to scour floors, and said to be better than soap : the flowers are used as a substitute for capers. *Sconzonera hispanica* (scorpion grass) grows about two feet high ; it has a beautiful pointed leaf with white veins. *Ceratonia siliqua* (St. John's bread) : the dry pulp in which the seeds are buried is very nutritious, and supposed to have been the food of the apostle St. John in the wilderness, hence it having been called "St. John's bread." Singers chew the fruit for the purpose of improving the voice. *Olea europea* (the olive) : it grows abundantly in Lebanon, olive oil being expressed from the ripe fruit. *Calletia horrida*. The leaves of this plant are armed with sharp spines, branching out in all directions. and presenting a very horrid appearance. *Pistachis terebinthus* : this class are remarkable. *Bunias orientalis* : this class produces the earth nuts or pig nuts. *B. ferulaceum* has also edible tubers which are termed *Tapana*. Mr. Talbot reported a large quantity of the spotted flycatchers having been seen on the Horbury-road and in Thorne's Grounds.—J. SPURLING, Hon. Sec.

WEST RIDING CONSOLIDATED NATURALISTS' SOCIETY.—RAMBLE AND MEETING AT ASKERN.—The usual Whit-Monday excursion and meeting of the West Riding Consolidated Naturalists' Society took place at Askern, when a strong muster of members from various

parts of the country, availed themselves of the opportunity to investigate the district. Elmsall, Hampsall, Burghwallis, Sutton, Campsall Norton, and Smeaton, were among the places visited, and a fair collection of specimens gathered, and exhibited at the meeting which was held in a large room adjoining the Swan Hotel. The president of the Society, Joseph Wainwright, F.L.S., of Wakefield, occupied the chair, and opened the meeting with remarks relative to the business of the evening. The botanical specimens, of which there was a good collection, were named by Mr. F. Arnold Lees, F.L.S., of Leeds, and Dr. Parsons, of Goole, and amongst them were :—*Hippuris vulgaris*, *Potamogeton crispus*, *Anthyllis Vulneraria*, *Plantago media*, *Parnassia palustris*, *Rhamnus catharticus*, *R. Frangula*, *Carex panicea*, *C. intermedia*, *C. riparia*, *C. paludosa*, *C. flava*, *C. lepidocarpa*, *C. stricta*, *Lithospermum arvense*, *L. officinale*, *Eupatorium cannabinum*, *Rumex Hydrolapathum*, *Pedicularis palustris*, *Geranium molle*, *Hottonia palustris*, *Valeriana dioica*, *Hydrocharis Morsus-ranæ*, *Potentilla procumbens*, *Pastinaca sativa*, *Hydrocotile vulgaris*, *Bromus erectus*, *Avena pubescens*, *Schlerochloa rigida*, *Cladium Mariscus*, *Myriophyllum alternifolium*, *Helosciadium nodiflorum*, *Listera ovata*, *Lastræa Thelypteris*, *Stellaria neglecta*, *Chara* (several species), *Ranunculus flammula*, *Astragalus glyciphyllus*, *Orchis Morio*, *Aquilega vulgaris*, *Vicia sativa*, *Narcissus biflora* (naturalised), *Cerastium arvensis*, *Arabis hirsuta*, *Armoracia Rusticana*

(escape), *Apargia hispida*, *Daphne Laureola*, *Helianthemum vulgare*, *Trifolium minor*, *Poterium Sanguisorba*, *Galium Mollugo*, *Ranunculus trichophyllum*, *R. circinnatus*, *Lepidium campestre*, *Colchicum autumnale*, *Hypnum cuspidatum* (in fruit), *Climacium dendroides*, *Aulacomnion palustre*, *Polyporus squamosus*, &c. The specimens of conchology, land and fresh water, of which there was a greater number of species and varieties than ever had been exhibited at a West Riding meeting before, were named by Mr. J. Wilcock, of Wakefield. They were :—*Sphaerium corneum*, *Unio tumidus*, *U. pictorum*, *Anodonta anatina*, *Bythinia tentaculata*, var. *ventricosa*, *decollata*, and *excavata*; *B. Leachii*, *Valvata piscinalis*, *Planorbis albus*, *P. vortex*, *P. carinatus*, and var. *disciformis*, *P. complanatus*, and var. *rhombea*, *P. corneus*, *Physa hypnorum*, *P. fontinalis*, *Limnaea peregra* and var. *ovata*, *L. stagnalis*, *L. truncatula*, var. *elegans* and *minor*, *Limax lævis*, *Succinea putris*, *Vitrina pellucida*, *Zonites cellarius*, *Z. alliarius*, *Z. nitidulus*, *Z. purus*, and var. *margaritacea*, *Z. crystallinus*, *Z. fulvus*, *Helix aculeata*, *H. aspersa* and vars. *conoidea* and *tenuis*, *H. nemoralis*, and vars. *hybrida* and *major*; *H. arbustorum*, *H. Cantiana*, *H. rufescens*, *H. concinna*, *H. hispida*, and var. *subrufa*, *H. virgata*, *H. caperrata* and var. *major*, *H. ericetorum*, *H. rotundata* and var. *minor* and *pyramidalis*, *H. pygmæa*, *H. pulchella* and var. *costata*, *H. lapicida*, *Bulimus obscurus*, *Pupa umbilicata*, *P. marginata*, *Vertigo pygmæa*, *V. endentula*, *V. minutissima*, *Clau-*

silia rugosa and vars. gracilior and tumidula, Cochlicopa lubrica, and var. lubricoides, viridula and ovata, Achatina acicula, Carychium minimum, Acme lineata. Mr. S. D. Bairstow, of Huddersfield, named and described the lepidoptera exhibited in the larva and imago states, but there was nothing specially worthy of mention, *Smerinthus ocellatus* being the best species taken. Mr. T. Lister, of Barnsley, made some interesting remarks on the birds which had been heard and seen during the day. He observed that nearly all the birds reported at the Middlestown meeting had been again reported at the Askern—some of them in much greater numbers. The house martin, scarce in some parts this year, he had observed in large numbers about Cudworth, Brierly Manor, Ringston Hill, South Kirkby, Elmsall, and Campsall. The more common birds had enlivened the lengthened ramble with their songs and call-notes, but on leaving the coal formation and traversing the lower new red sandstone underlying the magnesian limestone, the beds of gypsum, red marl, the upper slaty limestone and the new red sandstone, the observations of birds, plants, and shells were richer and more varied in character. The birds reported included :—Summer migrants—the whitethroat, whinchat, sedge warbler, wood wren, chiffchaff, red-start, garden warbler, black-cap, lesser whitethroat, tree pipit, cuckoo, Ray's, or yellow wagtail, swallow, house and sand martins, swift, landrail, and nightingale, five or six pairs of which are

reported between Barnsley and Askern. The residents included—corn bunting, common linnet, lesser redpole, and most of the generally common species. The geology of the district was described by Mr. H. F. Parsons, M.D., of Goole, who exhibited several fossils collected from the limestone quarries, and a few of the recent fossil shells found in the alluvial soil of the locality. He also exhibited a curious lizard and a common ringed snake, captured during the day, both of which he proved to be harmless, whilst the adder or viper (which he described) is a most dangerous reptile. Mr. Washington Teesdale, of Leeds, exhibited the Field Naturalist's Microscope, an invention of his own, more especially for dissecting purposes, and now made for sale by the eminent firm of Field and Son, of Birmingham. The instrument is furnished with all the essential accessories of condensers, and stage forceps, rack motion, three object glasses, &c., all of which are of the best possible description. Mr. Teesdale also spoke in high terms of the cheap object glasses made by the firm of Parker and Sons, of Birmingham. Votes of thanks were given to F. B. Franks, Esq., of Campsall Park, William Lee, Esq., of Grove Hall, and other gentlemen, for their kind permission to the members of the Society to visit and collect specimens on their grounds.—J. M. BARBER.

ERRATUM.—In June No., p. 166, line 1, for “tinged” read “ringed.”

Diary.—Meetings of Societies.

- July 1. Clayton West. Mirfield. Paddock.
 ,, 3. Barnsley. Stainland. Todmorden.
 ,, 4. Liversedge.
 ,, 5. Holmfirth.
 ,, 6. Wakefield. Bradford Scientific.
 ,, 8. West Riding Consolidated Naturalists'—Excursion to Elland: Meeting at the Royal Hotel, at 5 p.m.
 Ripponden. Honley. Middlestown. Huddersfield: Paper on "Aquaria," by the Rev. G. C. B. Madden, B.A.
 ,, 10. Rastrick.
 ,, 11. Bradford.
 ,, 12. York.
 ,, 13. South London Entomological Society.
 ,, 14. Bradford.
 ,, 15. Paddock. Ovenden—Excursion to Ogden: meeting at Crown and Anchor Hotel, Mixenden, at 6 p.m.
 ,, 20. North Staffordshire Field Club—Excursion to Arbor Low.
 ,, 22. Heckmondwike. Honley. Ovenden.
 ,, 24. Huddersfield—Paper, "Some Curiosities of Botanical Science," by Mr. C. P. Hobkirk.
 ,, 25. Bradford.
 ,, 27. South London Entomological Society.
 ,, 29. Ovenden. Paddock. Bradford Scientific—Excursion to Victoria Cave, Settle; train (Midland) 7 a.m.

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EXCHANGE.

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THE

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Journal of the Yorkshire Naturalists'
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GENERAL FIELD RECORD.

NEW SERIES.

EDITED BY CHAS. P. HOBKIRK AND G. T. PORRITT, F.L.S.

VOL. II., 1876-7.

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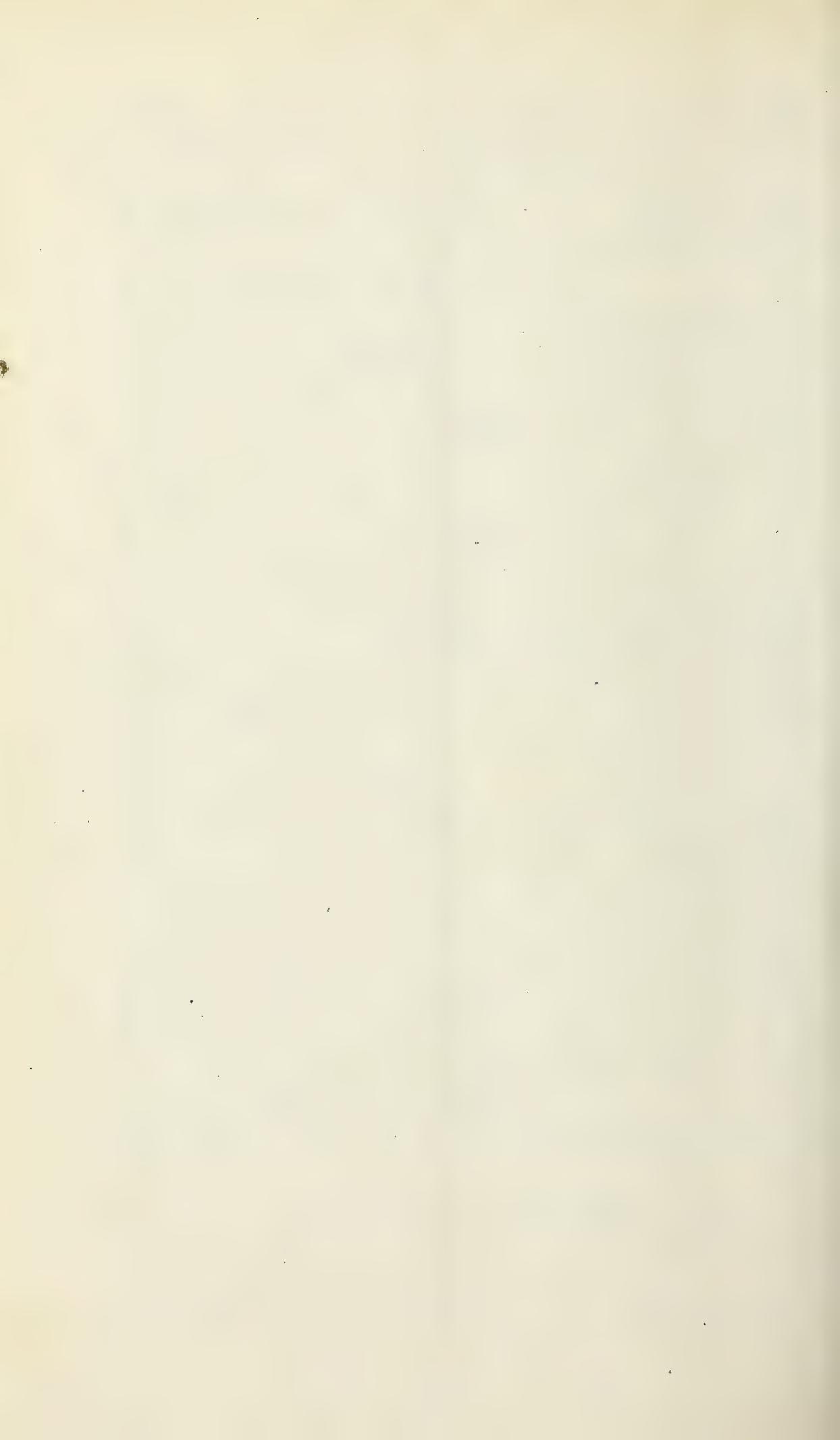
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AUGUST, 1876.

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TO CORRESPONDENTS.

The Editors will esteem it a favor, if the Secretaries of Field Clubs and Naturalists' Societies throughout the Kingdom will favor them with occasional Notes of their proceedings and Excursions, when of interest.

Papers read at Meetings of these Societies, or otherwise, on any branch of Natural History, will be gladly received and inserted in full, if of sufficient general interest, or in abstract, if of only local interest.

All communications, except Advertisements, Exchanges, or Short Queries, should, if possible, be in the hands of the Editors not later than the 18th of the current month, to insure insertion in our next issue, and should be written on one side of the sheet only.

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A D D R E S S.

HAVING now completed our First Volume—and with this issue commenced our Second,—it may be useful both to ourselves and to our subscribers to review our past short history, and also to revert to the future. As to the past: How have our promises and anticipations been fulfilled? We proposed, as one of our objects, “to afford a means of communication amongst all Natural History Societies, either within or outside the boundaries of the county of York.” We may in this respect congratulate ourselves upon a fair success, as we now report monthly the proceedings of eighteen Yorkshire Societies and some half-dozen exterior Societies occasionally, and many of these reports contain matters and observations of great interest.

Of observations and notes in] Natural History, we have been moderately successful in obtaining a fair share, considering the number of our competitors. Some of these notes are of great value, and without desiring to be in any way critical as to their merits, we feel in duty bound to mention the contributions of our friends Messrs. J. H. Gurney, Jun., Joseph Anderson, Jun., F. G. S. Rawson, F. Arnold Lees, F.L.S., and Wm. Prest.

A very important part of our last volume, though one not occupying much space, is the monthly record of the Rainfall in this district, kindly contributed by our friend Mr. J. W. Robson. Of original articles, the “Birds of Wakefield,” by Mr. Talbot of Wakefield, is a valuable record of local ornithology; and, amongst others of great value, we may be allowed to mention specially Mr. J. Bagnall’s paper on the “Reproduction of Ferns and Mosses,” Mr. Thomas Tate’s on the “Organization of *Daphnia Pulex*,” Mr. Spencer’s “Geology of the Halifax Hard-bed Coal,” and Dr. H. F. Parson’s “Maritime Plants and Tidal Rivers of the West Riding.” In mentioning these valuable papers thus particularly we do not for a moment undervalue those of our many other valued correspondents, and we would here take the opportunity of thanking them, one and all, for their kindly support and co-operation.

. As to our future: We have promises of papers already for our second volume of great value, which will appear in due course, and

which we are sure will prove of permanent interest to our subscribers. In our "Observations" column and "Reports of Societies," we trust to receive as many or more than in the past; at the same time we would venture to suggest to the secretaries of Societies that they should endeavour to make their reports in as condensed a form as is consistent with their subjects. As much information may often be conveyed in one terse paragraph as in half-a-page of copious verbiage.

To our subscribers we can only give one piece of advice—*continue your subscriptions, and let each get at least one more.* By so doing they will not only increase the usefulness of this Journal by increasing its circulation, but they will also increase it by providing more ample funds, thus rendering it possible to enlarge it in size, and probably enable us to improve it by occasional engravings and illustrations.

As to ourselves, we can only say we are in the hands of our subscribers and contributors, and if they will only continue their support and co-operation, we will spare no pains or time in rendering the Journal worthy of their labours and money.

Original Articles.

GEOLOGY OF THE HALIFAX HARD BED COAL.

By J. SPENCER.

(Concluded.)

THESE coal balls are similar in form and composition to the baum pots, with the exception that they contain a less proportion of lime and a greater proportion of pyrites, many of them being in fact wholly composed of that hard, brassy-looking substance. Their fossil contents are, however, totally different; instead of marine shells, we find a great variety of fossil plants, and, what is still more important, they are often so wonderfully preserved that their structure can be examined under the microscope as well as, and in some cases even better than, in recent plants.

Having now given a brief sketch of the geological surroundings of these coal balls, I will proceed to give some further information of the coal plants found in this neighbourhood, which is intended to

supplement and localise the excellent lecture given by my friend Mr. Butterworth last month. My friend and colleague, Mr. Binns, will show you sections, of his own preparing, of the plants which I shall bring before you, all from your own locality. Many and many a Saturday afternoon have we spent together collecting these specimens, but on him has devolved the labour of preparing them for the microscope; how far he has succeeded I will leave you to form your own judgment when you have seen them. The two most common plants we find in the coal balls are *Lepidodendron selaginoides*, *Sigillaria vascularia* (of Binney), and *L. Harcourtii*, their round and perfect stems being frequently met with. It is a most singular fact that, although *Sigillaria* is one of the most common fossils met with in the coal formation, its well-known form being met with in all sandstone rocks, in shale, and in ironstone, about 40 species being known, yet we rarely find it in the coal balls so preserved as to show the structure of the whole stem, in the same manner as we find the *Lepidodendron*. The cortical layer or bark is often met with; I have found some five or six different specimens. The *Stigmaria*, which is the root of the *Sigillaria*, is very abundant, and often well preserved. A vertical section of the bark, showing the manner in which the rootlets come out of the stem, is a very beautiful object. The structure is well shown in a transverse section. The *Lepidodendron* and *Sigillaria* belonged to the clubmoss family; the tallest clubmoss in the world does not exceed five feet in height, but these ancient clubmosses attained the girth and altitude of our modern forest trees.

I will next call attention to the *Calamites*—a class of fossil plants which belong to the same family as the horsetails of our ditches. You are all familiar with the sandstone cast which goes by that name, and of which I hold in my hand a fine sample. But this does not represent the plant itself, only the cast of its interior. The bark was smooth, not ribbed as the cast is. First we have a cortical layer of cellular tissue, then a woody zone, which consisted of a number of vascular wedges, the interstices of which were filled with cellular tissue, while the interior was hollow, except at the nodes. When the plant died, the cellular tissue between the wedges rapidly decayed, and the spaces, along with the centre, became filled with sand, hence these casts present a more or less ribbed appearance. The woody zone became mineralised into coal—which is the thin black smudge that always accompanies them when first disinterred by the quarrymen. The *Asterophyllites* was closely allied to the *Calamites*. The section of the *Zygopteris* is a splendid object. It seems

to occupy a midway position between the *Calamites* and the ferns. Ferns are among the most common fossils found in the whole coal formation. They are well represented in the coal balls—the stems, leaves, sporangia, and spores being frequently met with. The pines are the next that I have to notice, one of which is called *Dadoxylon*. The cast of the stem and its pith, which was formerly thought to be a distinct species, and known as *Sternbergia*, is frequently met with in our sandstone quarries. In the coal balls the whole stem is found in a perfect state of preservation. A microscopic section cut from one of these stems shows the annual rings of growth characteristic of exogenous plants and the disk-bearing tissue which is present in all known coniferae. The *Dadoxylon* was closely allied to the *Araucaria*, or Norfolk island pine, and it grew to a great height. I have met with them in our millstone grit rocks from one to two feet in diameter.

I now come to a most interesting class of fossils. In the coal balls of Southowram we find a variety of "seeds" of fruits called *Cardiocarpons*; one of them is about the size of a mustard-seed, and is covered with small bracts. M. Brogniart and Professor Williamson are just now investigating their structure; the former gentleman has described between 50 and 60 different kinds of them from the French coal fields. My friend Mr. Binns has been fortunate in finding some of these small fossils with spores in them. One small cone has the sporangia, or bags containing spores, arranged in rows, in single file, which appears to be closely allied to the *Lepidostrobus flemingites* alluded to by Professor Huxley as forming a large proportion of the Lowmoor better bed coal. There is a very remarkable fact about these sporangia, and that is, that the sporangia of the ancient gigantic lepidodendrons are no larger than the sporangia of our small modern clubmosses. The same holds good with the sporangia of the ancient and modern ferns. It is very curious, also, that the sporangia of the different species of ferns are all nearly of a size: for instance, those of the humble wall-rue are as large as those of the giant *Alsophila* of tropical regions. The sporangia of the horsetails of our ditches are as large as those of their ancient representatives the *Calamites*, which attained the height of from 20 to 30 feet.

The foregoing remarks will show what an important bearing the occurrence of these spore cases and spores in such a fine state of preservation, have upon the history of these fossil plants, and also the great importance of the study of these coal ball specimens, and the interest which is attached to them by all our great fossil botanists.

THE BIRDS OF WAKEFIELD:

With particulars of the occasional visits of Rare Species, and of those that have been observed to breed in the neighbourhood,

FROM 1845 TO THE PRESENT TIME.

BY WILLIAM TALBOT.

(CONTINUED).

RINGED PLOVER (*Charadrius hiaticula*)—

Several have been shot at Cold Hiendley reservoir. A pair is now in the collection of Mr. G. W. Marsden, Wakefield, shot in that locality.

LITTLE RINGED PLOVER (*Charadrius minor*)—

In 1851 three were killed by Mr. W. Firth, on the shingle in the bed of the Calder, at Horbury Mills.

PEEWIT (*Vanellus cristatus*)—

Breeds plentifully in this district. On the approach of any person the female is exceedingly cautious in leaving the nest: the male, in a very ostentatious way, endeavours to attract attention whilst the female has safely and unobserved left the nest.

TURNSTONE (*Strepsilas interpres*)—

This bird was shot at Cold Hiendley reservoir in September, 1868, by Mr. G. W. Marsden, and is now in his collection.

OYSTER CATCHER (*Hæmatopus ostralegus*)—

One was shot by Mr. E. Firth on the banks of the Calder, at Kirkthorp, in December, 1850, and another in February, 1851. Mr. Illingworth informs me that he has several times met with this bird on the Calder, at Horbury.

ARDEIDÆ.

HERON (*Ardea cinerea*)—

Up to the year 1865 it bred plentifully at Walton Hall, the seat of the veteran naturalist, Charles Waterton. He strictly prohibited guns from being fired near their breeding quarters, and he took great precautions that they should not under any circumstances be disturbed. On his death, I am sorry to say, a

complete change took place : gun and axe came into requisition : and now the once famed heronry is a thing of the past, and some of the very trees in which they built have been cut down. Four years ago, a pair attempted to build in Haw Park, and since that time they appear to have left us entirely in the breeding season.

LITTLE BITTERN (*Botaurus minutus*)—

A female was shot at Cold Hiendley, on the 20th August, 1872, by Mr. S. Wilson, of Winterset ; it subsequently came into my possession, and now it is in Mr. G. W. Marsden's collection.

BITTERN (*Botaurus stellaris*)—

One was shot in Ouchthorpe Lane in 1845, which I saw when it was sent to Mr. Wright to be preserved ; one was shot at Chevet, by Sir L. M. S. Pilkington, Bart. ; and in January, 1867, one was caught, in an exhausted state, among the willow stumps on the banks of Cold Hiendley reservoir, by Mr. Simpson, of Walton, and it is now in Mr. Marsden's collection ; Mr. Marsden also shot one at the same reservoir, on the 21st May, 1868 ; and Mr. W. Hall, superintendent of police, killed one at Newmiller-dam, 3rd January, 1870 ; W. H. Gill, Esq., Mayor of Wakefield, has one in his possession which was shot in Red Hall Lane, 25th November, 1870.

SPOON BILL (*Platalea leucorodia*)—

It has been reported to me that this bird was killed at Horbury Mill dam in 1850, by Mr. Firth.

SCOLOPACIDÆ.

CURLEW (*Numenius arquata*)—

Several have been shot in this district ; one in my collection was shot near my house.

WHIMBREL (*Numenius phœopus*)—

Mr. Marsden has one in his possession which he shot at Cold Hiendley.

REDSHANK (*Totanus calidris*)—

Several have been shot in a piece of boggy ground known as the "Old Calder."

GREEN SANDPIPER (*Totanus ochropus*)—

Mr. Parkin and Mr. Lumb have received specimens of this bird to be stuffed, which have been shot in this district.

SHORT NOTES AND QUERIES.

COMMON SANDPIPER (*Totanus hypoleucus*)—

During ten months of the year it frequents all the reservoirs and dams in this district. It may be found on the banks of the Calder from Horbury Bridge to Bottom Boat. It leaves us from the middle of May to the middle of July, and on three occasions when visiting the lakes between those dates, I have found it sporting in the streams about Ambleside and Keswick.

GREENSHANK (*Totanus glottis*)—

One was shot at Healey, near Horbury, in February, 1865, and was sent to Mr. Lumb to be preserved. It is now in the collection of Mr. W. H. Gill.

(*To be continued.*)

Short Notes and Queries.

THE RAINFALL OF JUNE.—During June 2·97 in. of rain fell in 11 days, making a total for the six months of 14·23 in., against the average during 1866-75 of 2·15 in. for June, and 14·17 in. for the half-year. The deficiency of May has thus been made up, and the six months' total turns out unusually close to the mean of previous years. The number of wet days during the half-year has been 97, the average being 90. The heaviest day's rain fell on the 23rd, when the gauge indicated 1·58 in.

Dalton, 25th July, 1876.

J. W. ROBSON.

RAINFALL AT WAKEFIELD.—Rain has fallen on nine days in June, making altogether 1·99 in. The greatest fall in one day was 1 in. on 23rd June, and the highest maximum temperature in shade was 85° on the 20th.

FREDK. HILL.

CURIOS NESTING PLACE OF THE WILLOW WARBLER, &c.—On the 6th instant, as I was coming from one of the water-falls at Goit-stock, where I had been in search of the nest of a water ouzel, I found a willow wren's nest about a yard distant from the ground, and built between two rocks which were placed at an angle of about 40 degrees from each other. I had not the slightest doubt as to its being the willow wren, as I both saw the bird come off the nest, and heard its well-known call note, which it kept repeating as it flew about my head. On the 5th instant I called at a nest which I had found a few days previously, built in a hazel tree a little lower down the valley. I was a little doubtful when I found it as to whether it was a black-cap warbler or a garden warbler, as it was not quite built, and I had heard both in close proximity to the nest. On going up to the nest I saw a bird's head, though I could not tell what species it was until it flew off, when I saw it was a European wren. I

once found a wren sitting upon the eggs of a white-throated warbler. Some time about the end of last June, as I was coming through Bingley Wood, I found a garden warbler's nest built in the midst of the fronds of the common male fern (*Lastroea filix-mas*). The fronds were arranged in a circle, and the nest was placed about eight inches from the ground ; it was conspicuous for a considerable distance. It differed very much from the usual place it selects for its nest, which is generally in a thick bush of honey-suckle or wild rose.—E. P. P. BUTTERFIELD.

Wilsden, Bingley, July 8th, 1876.

THE SKYLARK.—Some time ago, I saw at a bird-catcher's shop in London twelve cages full of larks, all taken the night before by one man. I was told there were 96 of them. What a drain on the species this must be if there are many men who catch the birds at this rate ; and yet there seems no diminution in their numbers, but rather contrariwise. The solution is that the gaps are replenished by a vast band of migratory sky larks which pour into our country in the fall of every year, from the north and from the east, and of these many press on still further south, but return with returning summer, or as early as February and March.

Northrepps Hall, Norwich.

J. H. GURNEY, Jun.

CAMPHOR CELL FOR CABINETS.—For the benefit of collectors of insects I may mention that I have found the following a capital plan for the introduction of camphor in cabinets as a mite destroyer. At one of the ends in the inside of the box cut a small hole, say 1in. \times $\frac{1}{2}$ in., and $\frac{1}{4}$ in. into the wood, so as to allow ample space for the camphor ; then at the mouth of the receptacle thus formed have two grooves—one at either side, so as to permit a piece of perforated zinc to slide therein, care being taken not to interfere with the closing of the glass lid. By this means the lid of the case will prevent the zinc slide from moving about, and the camphor has full access of scenting power, without being a nuisance and superfluous block to the collector. I have adopted this arrangement with my cabinet, and can testify to its being a valuable acquisition and an “ornament to the estate.”

S. D. BAIRSTOW.

Woodland Mount, Huddersfield, July 11th, 1876.

Crataegus laciniatus. Ster.—I was much interested by your note on this plant in last number, and now enclose a sprig which I gathered on 2nd instant, in a hedge in this neighbourhood, where it seems to be the prevailing form. Part of the hedge had been cut down, and the young shoots were growing vigorously, with very fully developed leaves, and yet cut down to the midrib, as shewn in the separate leaf enclosed. Is this your *laciniatus*?—J. P. SOUTTER.

Bp. Auckland, 4th July, 1876.

[The sprig and leaf alluded to, we should unhesitatingly refer to *C. laciniatus*. They are of more than the usual size.—*Eds. Nat.*]

Reports of Societies.

BISHOP AUCKLAND NATURALISTS' FIELD CLUB.—This Club was commenced in the latter end of May this year, since which time there have been elected 20 patrons—comprising the most influential gentlemen in the neighbourhood—and close upon 140 ordinary members have been enrolled. On Whit-Monday last the members held their first field day at Middleton-in-Teesdale, from whence the party (which numbered over 25) journeyed by brake to High Force—a noted water-fall in Teesdale—and from thence to Widdy Bank, the route from thence to Cauldron Snout being pursued across country. Several interesting specimens were obtained on the road, particularly by the botanists. On Tuesday, June 27th, the second field day was held at Richmond-in-Yorkshire, the excursionists being guided by the president and other members of the Richmond Club. Easby Abbey and Church ; St. Mary's Church, Richmond ; the private museum of Edward Wood, F.G.S., F.R.S.L. ; the castle, and other places of interest were visited by the party (which on this occasion numbered 40), and many specimens were obtained. The plants secured at both these excursions included : *Gentiana verna*, *Primula farinosa*, *Potentilla alpestris*, *P. fruticosa*, *Allosorus crispus*, *Asplenium Ruta-muraria*, *Scolopendrium vulgare*, *Parietaria officinalis*, &c. At Middleton several capital specimens of sugar limestone were obtained from the neighbourhood of White Force. It is proposed, when suitable arrangements can be completed, to open a museum in connection with the Club, and this, it is believed, will supply a great want both in the town and neighbourhood. Several of the honorary members and others are at present collecting for this purpose. The next field meeting will be held on Tuesday, the 25th inst., at Kepier Wood and Finchale Abbey, two noted places near the city of Durham.

THOS. WATT, Secretary.

BRADFORD NATURALISTS' SOCIETY.—Meeting July 11th, Mr. E. Margerison, president, in the chair. Several species of lepidoptera were exhibited by the members, including the black variety of *Amphydasis betularia*. Mr. J. W. Carter exhibited a number of botanical specimens, amongst which were *Malva sylvestris* and *Circea lutetiana*. The chairman read a paper on “The Varieties of the Human Race” ; a discussion followed.

J. W. W. BROOK, Hon. Sec.

HECKMONDWIKE NATURALISTS' SOCIETY.—Monthly Meeting 24th June, Mr. J. M. Barber, vice-president, in the chair.—After the preliminary part of the business had been gone through, the chairman gave a short

account of an evening he had passed on the previous Saturday, listening to the beautiful strains of the nightingale near Barnsley. He also gave some information respecting several interesting discoveries of old Roman roads in the neighbourhood, exhibiting specimens of the concrete of which they were formed. A number of plants were laid on the table and named by the chairman. Mr. J. L. Adamson exhibited specimens of lepidoptera.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting June 26th, the president, Mr. G. T. Porritt, F.L.S., in the chair.—In geology, Mr. Zilliken exhibited *Sigillaria* and *Calamites nodosus* from the millstone grit; Mr. William Milner *Ulodendron* from Fieldhouse; Mr. C. H. Bould *Ammonites communis* and *A. planorbis* from Llanberis. In botany Mr. Lister Peace showed various species from Snowdon and the neighbourhood, including *Sedum album*, *Allosurus crispus*, *Saxifraga hispida*, &c. Messrs. Joseph French, T. H. Bartlam, William Milner, and Ephraim Fisher exhibited local species, amongst them being *Hieracium amplexicaulis*, *Linum catharticum*, *Thymus Serpyllum*, *Habenaria viridis*, *H. albida*, and *H. bifolia*, *Ophioglossum vulgare*, &c. Mr. Samuel Bairstow exhibited the sand lizard (*Lacerta agilis*) from Southport. Mr. George Liversedge a nest with five eggs of the redstart (*Ruticilla phoenicurus*), built in a curious position at the foot of a tree. In entomology the chairman exhibited a series of *Agrotera nemoralis* and other species he had taken at Abbott's Wood, Sussex, at the end of May and beginning of June; Mr. S. Bairstow *Ennychia octomaculalis*, *Acidalia subsericeata*, *A. promutata*, and others he had taken in North Wales; also *Noctua Dahlii*, *Scodiona belgiaria*, &c., from our own district; the secretary (Mr. Geo. Brook) larvæ of *Orgyia fascelina*, *Trichiura crataegi*, *Clostera curtula*, *Taeniocampa populeti*, &c.; Mr. Joseph Parkin exhibited a very fine living *Mygale arenaria*, from Honduras. The conchological specimens included *Clausilia rugosa* and *C. dubia*, from Malham, by Mr. Lister Peace; and *Anadonta cygnea* from Campsall Park, by Mr. John Conacher, jun. A lively discussion, introduced by Mr. S. L. Mosley, then took place on the new "Wild Fowls Preservation Bill," which had just passed the third reading in the Commons; most of the members being of opinion it might have been made a much better Bill.

MEETING July 8th, Mr. Samuel D. Bairstow in the chair.—The first part of this meeting was but thinly attended, as a great many of the members were away at the West Riding Consolidated Society at Elland. On their arrival, however, at about 8 45 p.m., Mr. Joseph Tindall and Mr. G. T. Porritt, F.L.S., gave an interesting account of the Elland meeting, after which Mr. George Brook exhibited larvæ of *Liparis Salicis* and *L. monacha*; the chairman a box of lepidoptera taken by him

the previous week in Sherwood Forest ; and Mr. G. T. Porritt larvæ of *Boarmia cinclaria* and *Acidalia promutata* from J. G. Ross, of Bath ; also preserved larvæ and cocoon of *Nola albularis* from Strood, Kent. In botany Mr. Joseph French shewed a collection he had gathered a few days previously at Grange and neighbourhood, including *Habenaria bifolia*, *Listera ovata*, *Hypericum Androsænum*, *H. hirsutum*, *Helianthemum vulgare*, *Armeria maritima*, *Galium verum*, *Valeriana dioica*, *Trifolium procumbens*, *Meconopsis cambrica*, *Centaurea Cyanus*, *Ononis arvensis*, *Asplenium Ruta-muraria*, *Scolopendrium vulgare*, *Osmunda regalis*, *Asplenium Trichomanes*, *Allosurus crispus*, *Scrophularia nodosa*, *Verbascum Thapsus*. The Rev. G. C. B. Madden's paper on "Aquaria" was then read, in the course of which he described the two methods of construction in the large aquaria now becoming so popular at sea-port towns, viz : the aeration and circulatory systems, also the objections to each, and also the causes, &c., of the many failures on the first introduction of these new aquaria. The paper was most interesting, and at its close a discussion ensued, some members advocating the formation of an aquarium in the town, others as strongly condemning it. All were of opinion that these aquaria would exercise a most beneficial influence on the study of natural history generally. At its close, Mr. S. L. Mosley said that hitherto it had been exceedingly difficult to preserve the colour in *Neuroptera*, especially in the dragon-flies, when mounting them for the cabinet ; he had, however, quite overcome the difficulty by clearing the interior of the bodies, and filling them in with plaster of Paris until dry, after which it was removed.—GEORGE BROOK, ter., Hon. Sec.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—214th Meetng, June 27th, Mr. S. Jefferson, F.C.S., president, in the chair.—Mr. S. Schofield exhibited *Doronichum Pardalianches* from Batley, and *Aquilegia vulgaris* and *Geum rivale* from Thorner. Mr. F. Arnold Lees, F.L.S., showed *Cerastium arvense*, *Erodium cicutarium*, *Geranium pusillum*, and *Ornithopus perpusillus* from Dog Kennel Lane, near York, and *Œnanthe Phellandrium*, *Carex fulva*, *C. paludosa*, *C. panicea*, *Glyceria pedicillata*, and *Lastrea Thelypteris*, from Askham Bogs. Mr. John W. Taylor showed a large number of shells from South Australia, sent to him to be named ; Mr. William Nelson showed 20 species of *Clausilia*, from different parts of the world ; Mr. W. E. Clarke showed *Cypræa Europea* from the Farne Islands, and *Chelonia plantaginis*, from Harrogate ; Mr. John Grassham showed full-grown larva of *Lasiocampa callunæ*, and the president one or two caterpillars and a colony of young spiders. Mr. F. Greenwood again showed his admirable dissections of the common black slug, also a living albino example of the great warty newt (*Triton cristatus*) with pink eyes, from Windsor. Mr. Henry Crowther exhibited a large oyster, containing within it examples of numerous forms of marine life. Mr. C. H. Bothamley showed several minerals, including *Apatite*, *Gypsum*, *Selenite*, and *Fluor-spar*.

215TH MEETING, July 4th, Messrs. Fred. Coates and J. Grassham successively occupied the chair. Mr. R. Milestone showed *Stigmaria*, found recently in excavating villa-sites on the Roundhay Park Estate : Mr. F. Coates exhibited a tooth of *Ichthyosaurus* from South Carolina ; Mr. F. Emsley showed an abundant parasite upon the stickleback ; Mr. W. H. Taylor exhibited the larvæ and described the metamorphoses of the common ladybird. Mr. Grassham showed living larvæ of *Bombyx Perynii*, North China ; *Saturnia pavonia-major* ; its British relative, *S. carpini*, the emperor moth ; *Liparis auriflua* and *Vanessa Io*, the latter being rather early. Mr. H. Crowther exhibited *Smerinthus populi* and its eggs, taken near Leeds ; tooth of dogfish ; hermit crabs ; and three *Echini*, or sea-urchins, from the Yorkshire coast. Mr. C. H. Bothamley exhibited five specimens from the Permian :—Magnesian limestones from Pontefract, from Micklefield, and from Peckfield ; red marl from Fairburn ; and gypsum, found in the marl.

216TH MEETING, July 11th.—The chair was occupied in succession by the secretary ; Mr. F. Greenwood, Mr. John Grassham, and Mr. James Abbott. Mr. H. Crowther read a short paper giving an account of a day's collecting on Adel Moor, and lists of the birds and beetles he observed ; the beetles were exhibited. Mr. Thomas Rees showed specimens of stone coal from Normanton, very thickly intercalated with shells. Mr. S. Scholefield showed plants from New Jersey, U.S.A., insects, and minerals ; Mr. F. Greenwood brought *Hyponomeuta padi* and cocoons ; Mr. John W. Taylor showed *Helix personata*, the only European representative of the American subgenus *Tridopsis*, and other shells. Mr. Nelson presented to the Society, for the commencement of a local collection, *Limnaea glabra* from Castleford, and *L. palustris*, var. *corvus*, from Knaresbro' ; Mr. John Grassham showed a living German salamander, found in a window area at St. Mark's Villas, Leeds ; also eggs of golden pheasant, and of teal from Adel Moor. Mr. H. Pollard showed a number of birds' eggs and nests from Meanwood ; Mr. F. Arnold Lees, F.L.S., showed a number of interesting plants, including—*Cypripedium Calceolus*, the extremely rare "lady's slipper" orchid, collected June 17, near Shotton ; *Cystopteris alpina*, the alpine bladder fern, from rocks, Upper Teesdale, first discovered to be native in Britain in 1873, by Mr. Backhouse, jun. ; *Anthemis tinctoria* and *Alyssum incanum* from north-west of Thorp Arch, not before discovered in Yorkshire ; *Geranium columbinum*, *Genista tinctoria*, and *Hordeum sylvaticum*, from the neighbourhood of Walton ; *Carex teretiuscula*, *Ornithopus perpusillus*, *Trifolium striatum*, and *Filago minima* from Spofforth ; *Pyrola minor* from Hackfall, Ripon ; and *Ophrys apifera* from Redsham Lodge Park.

LIVERSEDGE NATURALISTS' SOCIETY.—Monthly Meeting in Millbridge School, July 4th, the president, the Rev. W. Fowler, in the chair. He exhibited fossils from the middle lias near Ilminster, and from the lower

greensand of Great Brickhill, including *Terebratula oblonga*, and *T. Proutoniana*, *Rhynchonella upinarensis*, *R. Cantabridgiensis*, and *Autodichotoma*. Several of the members brought specimens of plants and coal fossils, but there were none which had not been already recorded. The president performed a number of experiments with sulphate of lithia, shewing the characteristic reactions of salts of lithium (the lightest solid known), and giving an account of its bands revealed by the spectroscope. It was by means of this instrument, he remarked, that *Cæsium* and *Rubidium*, both rare metals belonging to the same group as *Lithium*, were discovered.

RASTRICK AND BRIGHOUSE NATURALISTS' SOCIETY.—Monthly Meeting July 10th, the president, Mr. E. Whiteley, in the chair. About fifty specimens of plants were exhibited, some of them rare in the district, viz :—*Erodium moschatum*, *Atropa Belladonna*, *Scandix Pecten-veneris*, *Potentilla alpestris*, *Hypericum Androsænum*, and *H. montanum*. The plants were named by Mr. G. B. Wentworth.

SELBY NATURALISTS' SOCIETY,—Meeting June 20th.—Mr. Thomas Foster read a paper on “The life history of a Moth,” describing the various changes undergone by insects, from the egg to the perfect insect, and exhibiting a choice collection of insects and other objects illustrating points mentioned in his paper. Mr. Foster said that out of the 64 species of British butterflies 30 may be found within a radius of six miles of Selby. Dr. Willis exhibited a specimen of the nest and eggs of the long-tailed titmouse (*Parus longicaudatus*), and the president some mineral specimens.

On July 6th the above Society had their first field excursion, which was made to Riccall Common and Skipwith, the party numbering about twenty members and friends. On leaving the vicarage, the party proceeded to the Common, and along the roadside through the village were found *Chelidonium majus*, *Malva rotundifolia*, and *Bryonia dioica*. On arriving on the Common the company divided into sections and commenced the work of specimen collecting, each to his own special department of science. This locality is usually very prolific in entomological specimens, but the late weather having been unfavourable to the insects, the only noteworthy captures of the day were *S. janira*, *C. pamphyllus*, *H. sylvanus*, *F. atomaria*, *M. montanata*, and *E. russula*. The botanists made some good finds, most of the work of the day apparently having been done in this branch of science. Among plants of note observed on the common were *Drosera rotundifolia* and *D. intermedia*; along the roadside were specimens of *Radiola millegrana*; about the ponds in the middle of the Common were noticed *Hypericum elodes*, *Littorella lacustris*, and *Alisma ranunculoides*. On the Skipwith side of the Common were found *Pinguicula vulgaris* and *Anagallis tenella*; also *Habe-*

naria bifolia, and *Listera ovata*. The rare and beautiful *Gentiana Pneumonanthe* was observed, but not in flower, also *Mentha Pulegium* on the edge of the common near Skipwith. The ferns observed were *Lomaria spicant*, *Asplenium Ruta-muraria*, *Nephrodium filix-mas*, *N. spinulosum*, and *N. dilatatum*.

H. N. CHEESMAN, Hon. Sec.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly Meeting July 6th, Mr. John Sims in the chair.—Mr. Hall exhibited *Plusia iota*, Mr. Wormald eggs of cole tit, lesser redpole, &c. ; Mr. Talbot a fine nest of the long-tailed tit in a bunch of furze, also a pair of hawfinches in very fine plumage, captured at Thornes. The evening being very wet, the attendance was smaller than usual.

J. SPURLING, Hon. Sec.

WEST RIDING CONSOLIDATED NATURALISTS' SOCIETY.—The fourth excursion and meeting of the season took place on Saturday afternoon, July 8th, when a considerable district surrounding the ancient village of Elland was diligently investigated for the collection of specimens and making notes and observations to illustrate the natural history of the district. Amongst the places visited were Fixby Park, Rastrick, Brighouse, Southowram, Norland Moor, Greetland, Elland Edge, Lindley Moor, and Stainland, where the interesting grounds, conservatories, aviaries, &c., of S. W. Shaw, Esq., of Brooklands, Holywell Green, were open for the members and friends of the Society to inspect. Towards five o'clock, the greater part of the members having arrived at the rendezvous, the Royal Hotel, Elland, and partaken of a substantial tea, the tables were prepared. and the specimens of various descriptions arranged thereon. The president, J. Wainwright, Esq., F.L.S., occupied the chair. The report of the previous meeting, held at Askern on Whit Monday, as printed in the *Naturalist*, having been taken as read, the roll list of societies in the union was called over, when the following were found to be represented :—Huddersfield, Heckmondwike, Barnsley, Wakefield, Ovenden, Stainland, Liversedge, Rastrick, Mirfield, Honley, Bradford, Leeds, and the Huddersfield Literary and Scientific. In a few brief remarks made by the president, the members of the Society were stimulated to note and record any fact in natural history which might come under their observation, as many of the principal discoveries in natural science had been gradually developed from what might at first appear trifling occurrences. By desire, the Rev. W. Fowler, and Mr. C. P. Hobkirk of Huddersfield, named and described the large collection of botanical specimens obtained during the day, and which numbered about 140. Amongst them were—

<i>Lapsana communis</i>	<i>Tragopogon pratensis</i>
<i>Hieracium vulgatum</i>	<i>Eupatorium cannabinum</i>
„ <i>boreale</i>	<i>Arctium commune</i>
<i>Senecio Jacobaea</i>	<i>Jasione montana</i>

<i>Malva rotundifolia</i>	<i>Hypericum pulchrum</i>
<i>M. moschata</i>	<i>Tamus communis</i>
<i>Medicago lupulina</i>	<i>Myosotis palustris</i>
<i>Lotus corniculatus</i>	<i>Borago officinalis</i>
<i>Digitalis purpurea</i>	<i>Echium vulgare</i>
<i>Veronica serpyllifolia</i>	<i>Lycopus Europeus</i>
<i>V. hederifolia</i>	<i>Scutellaria galericulata</i>
<i>V. agrestis</i>	<i>Stachys sylvatica</i>
<i>Scrophularia nodosa</i>	<i>S. Betonica</i>
<i>Pimpinella Saxifraga</i>	<i>Erica cinerea</i>
<i>Scandix Pecten-veneris</i>	<i>Alisma Plantago</i>
<i>Petroselinum sativum</i>	<i>Potamogeton crispus</i>
<i>Artemesia vulgaris</i>	<i>Sagittaria sagittifolia</i>
<i>Matricaria Chamomilla</i>	<i>Catabrosa aquatica</i>
<i>Conium maculatum</i>	<i>Alopecurus pratensis</i>
<i>Silene inflata</i>	<i>Lolium perenne</i>
<i>Sagina procumbens</i>	<i>Melica uniflora</i>
<i>Funaria clavicolata</i>	<i>Holcus mollis</i>
<i>Lysimachia vulgaris</i>	<i>H. lanatus</i>
<i>Chelidonium majus</i>	<i>Juncus diffusus</i>
<i>Linum catharticum</i>	<i>Ophioglossum vulgatum</i>
<i>Habenaria viridis</i>	<i>Polyporus squamosus</i>

Mr. James Spencer, of Halifax, was next called upon to report upon the geology of the neighbourhood, and to name the fossils exhibited. In his remarks Mr. Spencer observed that the rock seen on each side of the valley was the uppermost bed of the millstone grit, called the "rough rock." It is here, he said, prolific in the common coal measure plants, but they are not in a good state of preservation. There were a few specimens from the quarry opposite, consisting of impressions and casts of *Sigillaria*, a not very common form of lepidodendron, &c., and also a very good specimen of *Dictyoxylon*. A little lower down the valley the lower coal strata form the surface, and there, as well as on the hill-sides above, the Halifax coals are worked. The roof of the "hard-bed" yields here, as well as in some other places, an abundance of marine shells, consisting of *Goniatites*, *Nautili*, *Orthoceras*, *Aviculo-pecten*, &c.; whilst the coal itself yields those famous coal balls which contain such a rich suite of plants, and in so fine a state of preservation as to show, under the microscope, their internal structure, as well as those of recent plants. In the bed of the river and along its sides we meet with far-travelled boulders, which bear evidence of the "age of ice," consisting of granites, syenite, silurian grits, trap rocks, &c. The nearest place where such rocks occur *in situ* is the Cambrian mountains; some of these rocks have such peculiar characteristic features as to enable us to trace them to the parent rock often hundreds of miles away. Thus, boulders of the

Dalbeattie granite, from the Galloway mountains, of the St. John's Vale syenite, and of the Ennerdale syenite from the Lake district, occur at Elland in tolerable abundance. At Elland Station and Cemetery there are beds of old river gravel and boulders of local sandstone which are of far older date than even the glacial beds. Mr. Spencer entered pretty fully into the various theories respecting their appearance in the Calder valley ; he also gave his opinion with reference to what is usually termed "rain-drop marking" on the local flagstone deposit, but which he believed to have been made by marine worms which had infested the mud shallows of the sea at the period of deposit. This opinion was also held by the Rev. W. Fowler.—Mr. J. Tindall, of Huddersfield, exhibited hazel nuts found at the depth of 12 to 14 feet in the alluvial deposits of the Calder. Mr. G. T. Porritt, F.L.S., reported on the lepidoptera of the locality and named the specimens, including *Notodonta camelina*, *N. dromedarius*, and others. The birds of the district were reported upon by Mr. T. Lister, of Barnsley, Mr. C. C. Hanson, of Stainland, and other ornithologists. Mr. Lister remarked that the birds were found less numerous on this occasion than had been observed in the spring excursions, perhaps on account of the thick foliage, and their being busily employed in feeding their young, causing them to sing more rarely at this period of the year. Of the summer migrants we have recorded the sedge warbler, wheatear, whitethroat (with young), whinchat, willow wren, tree pipit, yellow or Ray's wagtail (with young) in mottled darkish grey plumage, robin (with young) in mottled darkish brown plumage, redstart, swallow, house martin, sand martin, and swift. The resident birds were—the marsh and blue tit, missel thrush or storm cock, song thrush, blackbird, skylark, meadow pipit or titlark, grey or song linnet, green linnet or greenfinch, pied wagtail, lesser redpole, chaffinch, twite or mountain linnet, yellowhammer, corn bunting, tree or rock sparrow, wren, and jackdaws. The beautiful goldfinch was also reported, but the exact place prudently not revealed.—Mr. T. Ormerod, of Brighouse, called the attention of the members to the Societies' journal, *The Naturalist*, and congratulated the editors on the success they had attained in their first year's work. He was glad to hear that the editors were not out of pocket, and suggested that an occasional "editorial" should be given on bird preservation. The Rev. W. Fowler supplemented these remarks, recommending the magazine as the principal medium of communication amongst the societies of the West Riding. Mr. Hobkirk, on his own and the behalf of his co-editor, thanked the gentlemen for these remarks, which should be attended to as far as possible. The chairman, after reading a communication from the secretary of the Leeds Society inviting the co-operation of the Consolidated Society to their excursion to Boroughbridge and Aldborough, on Monday, the 7th August, reminded the members that the next Consolidated meeting would take place on Saturday, the 5th August, at Honley.

Diary.—Meetings of Societies.

- Aug. 1. Bishop Auckland Naturalists' Club. Leeds Naturalists' Club and Scientific Association. Birmingham, Liversedge.
- ,, 2. Holmfirth. London Entomological Society.
- ,, 3. Wakefield.
- ,, 5. West Riding Consolidated Naturalists'—Excursion to Honley: Meeting at Coach & Horses Inn, at 5 p.m. Huddersfield: Paper on "Extinct Animals," by Mr. Joseph French, Clayton West. Mirfield. Honley.
- , 7. Excursion to Boroughbridge and Aldborough, by the joint Societies of Leeds, Richmond, and Huddersfield.
- , 8. Leeds Naturalists' Club and Scientific Association. ham (Botanical Section). Bradford.
- , 9. York and District Naturalists' Field Club.
- , 10. South London Entomological Society.
- , 12. Rippenden. Middlestow. Paddock.
- , 14. Rastrick.
- , 15. Leeds Naturalists' Club and Scientific Association—Paper on "Rotifers" by Mr. F. Jefferson, F.C.S. Birmingham (Microscopical Section).
- , 19. Heckmondwike. Ovenden. Honley. North Staffordshire Naturalists' Field Club—Excursion to Chepsey, Ranton, and Gnosall: Leader Mr. Lynam.
- , 21. Huddersfield—Paper, "Popular Errors in Natural Science," by Mr. J. R. Dore.
- , 22. Leeds Naturalists' Club and Scientific Asssociation. Birmingham (Geological Section). Bradford.
- , 24. South London Entomological Society.
- , 26. Paddock.
- , 29. Leeds Naturalists' Club and Scientific Association—Paper, "Prehistoric Man,—Geologically, Ethnologically, and Archæologically considered," by Mr. Peter Gilston. Birmingham (Zoological Section).

Communications have been received from Thomas Lister, J. H. Gurney, Jun., Jas. Varley, Goole Scientific, Ovenden Naturalists, Sheffield and York Field Naturalists, Societies.

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Original Articles.

DESCRIPTION OF THE LARVA OF *NOLA ALBULALIS*.

By G. T. PORRITT, F.L.S.

ON the 13th of June last I received a supply of these larvæ from my friend Mr. J. P. Barrett, of Peckham, from which I at once took down descriptions as follows :—Length when at rest, five-eighths of an inch, when crawling three-quarters of an inch ; rather stout in proportion ; the head is a little narrower than the second segment, it has the lobes rounded, smooth and polished ; the body is of nearly uniform width, and is adorned throughout its entire length with six rows of conspicuous raised tubercles, and from each tubercle proceeds a tuft of tolerably long hairs. The outermost lateral tubercles are the largest ; immediately behind them is situated a row of smaller ones, whilst still higher, on the dorsal area, is a row in size intermediate between the two. The segmental divisions are well defined. There are two very distinct varieties : var. I. has the ground colour a delicate pale yellowish green ; in some specimens the head is nearly black, marbled with pale greenish ; in others pale green predominates, with the mandibles black and the marbling pale brown. Between the second and dorsal row of tubercles on each side is an irregular black stripe, composed of a longitudinal series of wedge-shaped marks, joined at the extremities, and outside each of these marks is a small black spot. On the seventh and eleventh segments is a sort of broken transverse collar, extending from the black stripe on one side to that on the other ; in some specimens there are also broken black marks in the centre of the sixth, eighth, ninth, and tenth segments, but these marks vary very much in size, and consequently in distinctness. In some examples, too, the black longitudinal lateral marks are not joined at the extremities, in which case they form a series of distinct wedge-shaped marks on the seventh to eleventh segments inclusive, but scarcely noticeable on the other segments ; in these specimens also the transverse collars are very slight, in some nearly absent ; the tubercles are of the same shade as the ground colour ; the long hairs black, the shorter ones grey. Ventral surface, legs and prolegs uniformly pale yellowish-green. Var. II. has the ground colour bright orange, varying in intensity in different specimens ; the head in some is of the same colour, in others nearly black ; the markings of the body black, arranged in all respects as in Var. I. There

is also a form which comes somewhat between these two distinct varieties, though more nearly resembling Var. I.; it differs from it, however, in having the head and all the tubercles bright orange. It feeds on dewberry, but when full-grown leaves the food-plant and ascends a culm of dried grass or a withered twig, where it spins its cocoon. This is composed of small portions of the outer covering of the grass or twig woven together, and shaped somewhat like the cocoon of a *Zygæna*, but of course smaller and narrower, and being covered with a coating of the material on which it is spun, is much less noticeable, and would doubtless be very difficult to find in its natural habitat. The pupa is about half-an-inch in length, cylindrical and of nearly uniform width throughout, tapering a little towards the anal extremity; head bluntly rounded, the eye and antennæ-cases prominent. The colour of the dorsal surface is deep reddish-brown, becoming gradually darker towards the head, which is nearly black; segmental divisions rather paler than the ground colour; ventral surface paler brown; the eye cases black, the antennæ-cases margined all round with black. The first imago emerged on July 5th.

ELEVEN DAYS IN CUMBERLAND.

BY JAMES VARLEY.

MAY 27th, I left home for the purpose of having a week's collecting in Cumberland, with my friend Mr. Parkin, who lives at Brampton, in that county. I started from Huddersfield at 8.40 a.m. and went by way of Halifax and through the beautiful valley of Hipperholme and Lightcliffe to Bradford, then made my way to the Midland Station, and left Bradford for Carlisle at 10-35. There is some beautiful scenery between Bradford and Skipton, and from there to Settle it is magnificent. In the limestone districts the railway banks are covered with cowslips and many other wild plants.

I then went on the new route from Settle to Carlisle, which is really magnificent in scenery; it passes through deep valleys with towering hills on each side, and many of the cuttings show the different strata of lime, shale, and other rocks. In some places the upheavals and throws are wonderful. When we come to Crosby Garrett, the red sandstone begins to show in places, and it extends as far as I have gone into Cumberland.

I arrived in Carlisle at 2-30 p.m., and had a walk through the Old Town down to the Bridge, which crosses the river Eden. I was tempted to have a stroll down its banks, for the scenery is beautiful, and there were many anglers fishing for salmon. Gulls and swifts were in profusion. Of insects I saw *Anthocharis cardamines* and *Argynnus Euphrosyne*, and a lot of small things.

At six I started from Carlisle to Brampton, on the North-Eastern line, where my friend Mr. Parkin was waiting for me, and we came down to the Old Town in the *Dandy*, as the line does not run within two miles of Brampton. There is nothing very striking in the town itself ; the old church is a plain structure, and there is a market-cross and a few good buildings, but the scenery around is beautiful. On the east end is a high hill surrounded by a moat, and on the highest elevation is a beautiful statue of the Earl of Carlisle.

May 28 : I spent the day with Mr. Parkin in and about Brampton, which is rich in natural history objects—plants, birds, and insects. The swifts are very numerous, and build under the eaves of the houses and the old church tower. In the afternoon we had a walk to the moat, and then to the Ridge, which is a splendid place with its long avenue of beech trees, and from this place can be seen one hill towering above another, right away into Scotland.

We then went down into the valley and crossed the river Irthing by the Abbey Bridge, which is near the old Priory, a splendid ruin.

Lanercost Priory was an Augustine monastery, the exterior at the west end is pitted with bullet marks. The portal at the west entrance consists of numerous mouldings, supported by small pillars with plain capitals and bases ; over it, in a recess surmounted with a Gothic canopy, apparently more modern than the rest of the building, is a well-sculptured figure of Mary Magdalene ; on her right is a diminutive figure of a monk kneeling. The nave is now used as a parish church, the tower, chancel, and cross aisles being roofless, dilapidated, and overgrown with ivy, briers, and wallflowers.

On entering, the visitor will see fixed to the wall on his left a tablet with this inscription :—" *Robertus de Villibus Filius Hoberti Dominus de Gilsland Founder Prioratus de Lanercoat Anno Domini 1116. Ada rugaine uxor ejus sine prole. Reverendus yor. Storj. A. M. hujus Ecclesiae Pastor Grato ariemo hunc Lapidem posuit A.D. 1761.*" The chancel contains many old tombs carved with different arms. We ascended a winding staircase and passed through many galleries,

which are habitations for owls, jackdaws, swifts, and starlings. On coming down we passed through the graveyard, which is surrounded with very old trees, among them being two very old yews. There are many ancient tombs, in one of which was a blackbird's nest containing five eggs. On leaving the Abbey we recrossed the river Irthing by some steps, and went up a beautiful glen which leads to Naworth Castle. The banks of this glen are covered with trees, rare ferns, and many choice plants. The water rushing down over the rock, makes it a noted place for dippers, kingfishers, and graywagtails. Naworth Castle once the feudal stronghold of the Dacres, and now belonging to the Howards, is one of the most interesting monuments of the feudal age that can be found in England. In it is some of the most splendid tapestry I have seen, and some very fine paintings.

May 29 : I had a walk on the old road to Carlisle, and collected larvæ of *Chelonia caja*, and also took *Anthocharis cardamines* and *Satyrus megæra*.

In the afternoon Mr. Parkin and I started for the Gelt, which is a beautiful stream of water running into the Elder, and abounds with trout and salmon. The scenery here is magnificent; it rises from the steep declivities of a wild and wooded ravine, which in one spot is called the Riven Rock, and in some places its waters rush down through deep ravines worn out in the red sandstone, which in some places is so contracted that one can jump across. There are some rare ferns, mosses, and many other plants of great beauty. We saw plenty of dippers and found one nest gray wagtails, and many of the tits and warblers; and we took *Tephrosia biundularia* before we reached the middle Gelt bridge, where is an old public house; and the line crosses over the valley by a very high viaduct. Here we had a rest and refreshed ourselves, and then came back on the opposite side of the river, where are some high cliffs, and over which two young owls looked at us; we got them down, finding them to be tawny owls, *Syrnium stridula*.

May 30 : I was so pleased with my last night's ramble, that I went again up the Gelt and found it still as lovely as before. Butterflies were flying in profusion. *Pieris rapæ*, *P. napi*, *A. cardamines*, *S. megæra*, hibernated specimens of *V. Io*, the beautiful copper *C. Phlæas* and *H. sylvanus*. I filled my boxes, and then went to the middle of Gelt bridge to refresh the inner man. Here I saw a puzzle to me at first, but on watching it with my field glass found that it was a male pied flycatcher (*Muscicapa atricapilla*). After

dinner I also saw the female, so I thought there must be a nest, and after a careful search I found it, with six beautiful eggs in ; I procured the birds and nest, with the eggs. I then made my way back to Brampton, well pleased with my day's sport, and my friend Mr. Parkin set the birds up for me.

May 31 : We started for another ramble down the banks of the river Irthing, crossing the fields into a lane that leads to the old parish church, which is a mile and a half from the town, and is only used as a cemetery. We then crossed the fields again and came upon a large bed of fine water-cress, and on reaching the banks of the Irthing, saw many gulls, swifts, and sand-martins, and in some places the banks were perforated with holes by the martins. In walking down, we came upon a sandpiper's nest with four eggs in, and as we proceeded further down we came to some large trees over-grown with ivy, in which we could see there was something roosting; commenced beating, and out came two tawny owls. Hearing a strange cry from some large bird overhead, I looked up, and saw a pair of ravens crossing the river to some cliffs in the distance.

June 1 : I had another stroll further down the banks of the Irthing, and found a sandpiper's nest, with four young ones just hatching ; the old bird tumbled over and over to attract my attention from the nest. I also found the blackheaded bunting's nest, with four eggs, and a nest of the sedge warbler ; on my way home I saw *Euclidia mi*, and *E. glyphica* flying over some grass fields.

June 2 : Mr. Parkin's son and I started for another ramble to the Gelt. It was very hot and butterflies were not so plentiful as before. We took *Euclidia mi* and *E. glyphica*, and a few small things. Tits and goldcrests were in profusion, but we could find no nests, except a squirrel's, at which we threw a stone, and out came the old one and ran up to the top of a high spruce fir. On our return by an old lane full of gorse and briars we found larvæ of *Odonestes potatoria*.

Saturday being very wild and wet we worked inside setting our specimens.

June 4 : Parkin and I started by rail for Gilsland Spar. Rosehill station is a beautiful place. Nature may here be seen in her quietest and lovelist aspect—balmy pathways through retired dells, sparkling rivulets—

Which clatter over stony ways
In little sharps and trebles,
overhanging rocks, whose rugged fissures bear witness to some great
perturbation of the earth in time past. Passing along from Rosehill

station towards Gilsland, we came to a hydropathic establishment, and a little further down is a house, round which the road bends at right angles before we reach the bridge over the Irthing. The front of this building has been altered, but the back remains its original character. This is Mump's Heard, or Beggars' Hotel, which used to be kept by a treacherous old landlady called "Mag Mumps." Mag is buried in the neighbouring Churchyard of Upper Denton, her tombstone bearing the following inscription:—"Mumps Hall. Here lies the body of Margaret Carricky, wife of Tho. Carrick, who departed this life 4th of December, 1717, in the 100th year of her age." Near her toombstone is that of her daughter, who kept the house after her, on which we read, "Here lieth the body of Margarit Teasdale, o' Mumps Hall, who died May 5th, 1777, aged 98 years.

What I was once some may relate,
What I am now is each one's fate ;
What I shall be none can explain
Till he that called calls again."

(To be Continued.)

Short Notes and Queries.

DEFORMITY OF A WIGEON.—Dec. 21st, 1866.—Skinned a wigeon. The right tibia was shorter than the left. Birds, like men, are subject to deformities. It appeared, on a critical examination, that this bone was not shortened by a wound.—J. H. GURNEY, Jun., Northrepps, Norwich.

THE "SUMMER PLUMAGE" OF DUCKS.—The "summer plumage" is an ornithological term that is often misapplied, especially in the case of ducks. Nearly all the males of this family attain their brightest plumage by Christmas, or a little after, and shed it for the more sombre dress of the female when she lays her eggs. It is, therefore, erroneous to speak of the handsome and distinctive garb of the merganser or the pintail as a "summer plumage."—J. H. GURNEY, JUN., Northrepps, Norwich.

DATES OF SPRING MIGRANTS ABOUT BARNSLEY AND THE SOUTH YORKSHIRE DISTRICT.

		First noted 1876.	Average date of 10 years.
<i>Saxicola oenanthe</i> (wheat-ear)	...	March 31	March 29.
<i>Sylvia rufa</i> (chiff-chaff)	...	April 1	April 2.
<i>Curculis canorus</i> (cuckoo)	...	5	14.
	Exceptional case. }	,	
Do. do. —Another date	...	18	
nearer average	...		
<i>Hirundo riparia</i> (sand martin)	...	8	9.
<i>Hirundo rustica</i> (swallow)	...	9	10.
<i>Motacilla campestris</i> (Ray's wagtail)	...	9	13.
<i>Anthus arboreus</i> (tree pipit)	...	9	15.

		First noted 1876.	Average date of 10 years.
<i>Hirundo urbica</i> (house martin) ...		April 9	April 14.
Also seen at Silkstone, near their old nests		,, 16	
<i>Ruticilla phoenicurus</i> (Redstart) ...		,, 15	,, 14.
<i>Turdus torquatus</i> (ring ouzel) ...		,, 15	
Forty seen near Ringing low moors, just arrived, previous to breaking-up for pairing.			
<i>Sylvia atricapilla</i> (black-cap warbler)		,, 16	,, 22.
<i>Sylvia trochilus</i> (willow warbler) ...		,, 16	,, 10.
<i>Pratincola rubetra</i> (whin-chat) ...		,, 18	,, 20.
Seen at Horbury April 7th (very exceptional).			
<i>Sylvia hortensis</i> (garden warbler) ...	May	6	May 6.
Recorded by Mr. Talbot April 22nd.			
<i>Sylvia sibilatrix</i> (wood warbler) ...	,,	6	April 30.
Noted by Mr. Talbot April 22nd.			
<i>Sylvia cinerea</i> (white-throat)	April	23	,, 25.
<i>Sylvia curruca</i> (lesser white-throat) ...	,,	23	May 4.
<i>Crex pratensis</i> (land rail)	,,	23	April 27.
<i>Salicaria phragmitis</i> (sedge warbler)	,,	24	,, 24.
<i>Arvicula locustella</i> (grasshopper warbler)	,,	24	,, 30.
<i>Totanus hypoleucus</i> (sand piper) ...	,,	26	
<i>Philomela luscinia</i> (nightingale) ...	May	2	,, 29.
Four or five pairs about Barnsley.			
<i>Muscicapa grisola</i> (spotted fly-catcher)	,,	9	May 14.
<i>Cypselus apus</i> (swift)	,,	13	,, 8.

It will be seen how irregular the arrivals have been ; after the first fine week in April, in the period of frost and snow that followed, we scarcely noted the Spring migrants, except the cases named. The main bodies came afterwards, from Easter until early May.—T. LISTER, Barnsley.

NESTING OF THE COLE TIT, &c.—On looking through Mr. Talbot's articles on the "Birds of Wakefield," I find he states that the Cole titmouse "arrives here from the north in October, and leaves us in March." That we receive an immigration of Cole tits from the north, in autumn, I do not doubt, but that a few remain with us to breed I can testify from personal observation. Several years ago (I do not know the particular year, but it was Whitsuntide) my brother took me to a nest containing young, which was built in a hole in a wall constructed for the purpose of carrying a bridge over a stream at Goit Stock. I also saw a pair of old birds whilst staying at Scugdale, near Stockton-upon-Tees, in July, 1862, which no doubt had either bred or were breeding in the locality. Mr. Marson, of Sandal, mentions in the June number of the *Naturalist*, a blackbird beginning to build its nest so early as the first week in March, this year. Notwithstanding the cold weather which we had last February, it was not sufficient to deter a pair of song thrushes from commencing building operations in a garden in this village. I did not hear of the nest until the 26th, on which date it had laid its third egg.—E. P. P. BUTTERFIELD, Wilsden, Bradford, August 15th, 1876.

Anthemis tinctoria AT HOLDERNESS.—*Anthemis tinctoria* is mentioned in last number of the *Naturalist* as having been found recently, for the first time, in Yorkshire. I have, however, found it for two past seasons in fields on the coast of Holderness, scattered sparingly, and doubtless introduced with seed.—GEO. WEBSTER, York, August 16th, 1876.

CAPTURE OF *Pachnobia alpina* AND *Noctua sobrina*.—Mr. Richardson and I succeeded in taking *Pachnobia alpina* in the mountains near Rannoch in a recent collecting expedition. *Noctua sobrina* turned up just as we were coming away, but we secured a short series each.

Norwich, August 10th.

F. D. WHEELER.

URTICATING LARVÆ.—The hedges here were in the month of May swarming with the caterpillars of the pretty brown-tail moth, *Liparis chrysorrhœa*. These larvæ have now become imagos, and you cannot fail at every stroke of the stick to drive out numbers of them. Spiders have a rare time of it. I counted dozens of hapless brown-tails in their webs : some dead and sucked dry, others "alive and kicking," and struggling to get free. Every entomologist is well aware of the urticating properties of the hairs of the larvæ ; but though I brought many of them home I did not experience the least annoyance through handling them. Now, however, strange to say, I cannot walk by the hedges where moths abound without suffering from a violent irritation of the face, neck, and hands ; and this I have repeatedly noticed, that the effects are far worse when the insects leave their cocoons, than in the larval state of their existence. Why, I cannot say, except that it is possible as the moths emerge, the hairs, which are so plentifully used in the construction of the cocoons, are set free. It is said that in the summer of 1865, so numerous were the caterpillars of *Cnethocampa pityocampa* in the Bois de Boulogne, that it was considered dangerous for people to walk in the rides ; they were consequently closed by the authorities. I should be glad to know of any remedy for allaying the intolerable itching produced by these urticating larvæ and cocoons, for the latter are equally as bad as the former. Does the irritation arise from the hairs merely piercing the skin, or are they poisonous ?—JOSEPH ANDERSON, Jun.

Chichester, July 29th.

RAINFALL AT HUDDERSFIELD.—During July, 2·09 in. of rain fell in 12 days, making a total for the seven months of 16·32 in. The heaviest fall was 0·70 in. on the 26th. The average of 1866-75 has been for the first seven months of the year 17·06 in., and for July, 2·88 in.—J. W. ROBSON, Dalton, 18th August, 1876.

RAINFALL AT WAKEFIELD IN JULY.—There have been ten rainy days in this month, making a total of 1·69 inches. The heaviest day's fall occurred on the 26th, when the guage registered ·55 inches. Temperature on the 16th, 94° in shade, it being the highest yet attained this year in this district.—FREDK. HILL, Kirkgate, Wakefield, August 17th, 1876.

Reports of Societies.

GOOLE SCIENTIFIC SOCIETY.—An excursion was made by this Society on Saturday, July 22nd, to Frodingham, Lincolnshire, under the able guidance of the Rev. W. Fowler, president of the Liversedge Naturalists' Society. Before they commenced their explorations Mr. Fowler gave the party a brief description of the geology of Frodingham and its neighbourhood. The north of Lincolnshire is traversed from north to south by three parallel ranges of hills, with intervening tracts. These ridges, which are well seen in travelling down the Humber to Hull, are each marked by a gently shelving slope to the east, and a steep escarpment to the west, and have been produced by the successive outcrops of the harder rocks, lower lias, lower oolite, and chalk having been left projecting, while the softer intervening strata have been worn away by denudation. Frodingham is situated on the eastern slope of the west or liassic range of hills ; the soil is barren or sandy, probably blown sand, resting on a thin bed of peat, beneath which lies the bed of ironstone, some 25 ft. thick, in which the mineral wealth of Frodingham consists. The yield of iron from the one is about 28 per cent. The ease with which the ironstone can be got, and the cheap rate at which it can be smelted, its calcareous nature rendering the addition of limestone as flux unnecessary, fully accounts for the rapid development which the iron industry of Frodingham has undergone. It was until lately supposed that the Frodingham ironstone was of the same geologic date as that of Cleveland, *i.e.*, of marlstone or middle lias age ; it has, however, been clearly proved by the Rev. J. Cross in a paper published in the Journal of the Geological Society, for 1875, that the Frodingham ironstone must be referred to a position considerably lower, *viz.*, to the zone of the lower lias characterized by *Ammonites semicostatus*. The party first proceeded to examine some ironstone pits, and afterwards walked to the railway cutting between Frodingham and Althorpe, where a fine section was to be seen of the beds of lower lias clay and limestone, of the zone of *Ammonites Bucklandi* underlying the ironstone. They were also conducted over the works of the Frodingham Iron Co. by Mr. P. Cliff, the manager. A collection of authentically-named fossils from the ironstone, in the possession of Mr. Cliff, was inspected, and was particularly welcome as affording an opportunity for naming the finds of the day. Fossils were found extremely plentiful, and well preserved in both the ironstone pits and railway cutting ; the species met with in both places being nearly the same. The most abundant was the large curved oyster—*Gryphaea incurva*—so characteristic of the lower lias ; it presented considerable variety of form, some specimens from the ironstone beds being as broad as *G. dilatata* of the clay. The other fossils met with were

Belemnites acutus, *Cardinia crassissima*, and other species, *Pecten aequalis* and *P. demissus*, *Taneredia ferrea*, *Pholadomya ambigua*, *Lima gigantea*, and *L. duplicata*. But little was attempted in the way of botany, the geological attractions proving most powerful to a party from a neighbourhood so unfossiliferous as that of Goole. The following plants, however, were observed :—*Sisymbrium Sophia*, *Ornithopus perpusillus*, *Trifolium arvense*, *Scleranthus annuus*; *Anchusa arvensis*, *Echium vulgare*, *Chenopodium album* var. *viride* *Agrostis Spica-Venti*, and *Holcus mollis*, *Chara vulgaris*. The liverwort *Marchantia polymorpha* was found, bearing male and female receptacles on the same plant. In a rill in one of the pits grew two beautiful algae, *Draparnaldia glomerata* and *Chætophora endivioæfolia* with exquisitely branched microscopic filaments. Several specimens of an uncommon fungus *Lentinus tigrinus* were found growing on the railway sleepers. The north of Lincolnshire, although but little worked hitherto, affords a fine field for the botanist, no fewer than 79 species hitherto unrecorded for the county having been sent by Mr. Fowler to the Botanical Record Club last year. It was decided that the next excursion should be held on Aug. 26th, to Drewton Vale and Newbald, *via* Brough.—H. FRANKLIN PARSONS, M.D., SEC.

HECKMONDWIKE NATURALISTS' SOCIETY. Monthly Meeting 22nd July, the president, Mr. T. B. Oldfield, in the chair, who exhibited some geological specimens from Coley Quarry, and a yellow-ringed snake from South America. There were also a few plants exhibited, and the evening was spent in discussion and conversation. The following works were added to the library, viz :—“Antiquity of Man,” and “Principles of Geology,” by Sir Charles Lyell: and “Geology for Students,” by Prof. Green.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting July 24th, the president, Mr. G. T. Porritt, F.L.S., in the chair.—Mr. Joseph Tindall exhibited the following chalk fossils, from the neighbourhood of Bridlington: *Spongia capitata*, *S. plana*, and *S. ventriculites*; also a peculiar green-stained flint from Flamborough Head; and stalactite and stalagmite from a new cave discovered by his brother Edward Tindall. In botany, Mr. Henry M'Kenzie exhibited *Blechnum boreale*, having both male and female leaves on one frond, from Harden Clough; and the following from Airedale:—*Polystichum lobatum*, *Asplenium Adiantum-nigrum*, *Polypodium Dryopteris*, *Aspidium dilatata* var. *cristata*, *Aspidium spinulosum*, &c. Mr. J. R. Dore showed *Ophioglossum vulgatum* from Whitley. In lepidoptera, the president showed larvæ of *Cheimatobia brumata*, *C. boreata*, and *Ebulea crocealis*, preserved and sent to him by Lord Walsingham. Mr. George Brook, imagos of *Iodis vernaria*, *Clostera curtula*, *Cucullia asteris*, larvæ of *Diphthera Orion*, and preserved larvæ of *Plusia chrysitis*, &c. Mr. H. M'Kenzie exhibited a splendid example

of *Atilus sincilolum* (flexible coral), from Cuba. Mr. S. L. Mosley introduced a discussion on the habits of the mason-wasp, more especially as to its manner of supplying its larvæ with food ; he found, on opening a nest, that it was completely filled up with living larvæ of *Tortrices*, a genus of insects extremely lively in the larval state, and it was unaccountable to him how the parent wasp induced the larvæ first put into the nest to remain whilst it fetched more, previous to closing up the orifice with mud. The president, Mr. Tindall, and Mr. James Varley considered the wasp must have some means of stupifying the larvæ for a time. A paper on "The Epidermis, and its Appendages" * was then read by Mr. George Brook (secretary). The position and structure of the epidermis were first explained, the cells, and stomata with the guard cells, &c., being clearly shewn by means of beautifully-cut sections under the microscope. The hairs and prickles of plants were also treated of, the microscopic specimens of which elicited great admiration amongst the members. This brought a most interesting meeting to a close.

MEETING August 5th, the president, Mr. G. T. Porritt, F.L.S., in the chair.—Mr. Joseph French exhibited the parasite *Cuscuta epithymum* on furze, a beautiful specimen gathered by himself at Tunbridge Wells. Mr. Joseph Copley shewed an immense fungus (*Polyporus giganteus?*) from willow, which elicited an interesting discussion. Mr. Joseph French then read a paper on "Economic Botany," after which the meeting was closed.

GEORGE BROOK, *ter.*, Hon. Sec.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—217th Meeting, July 18th, Mr. Samuel Jefferson, F.C.S., president, in the chair. Larvæ of *Notodonta trepida* and *Nyssia zonaria* were exhibited on behalf of Mr. John T. Calvert, of Keighley. Mr. Henry Pocklington, F.R.M.S., delivered a lecture upon "Colour," which was followed by a discussion.

218th Meeting, July 25th, the president in the chair.—A letter from Mr. Henry Hewetson, of Scarbro', was read, upon the occurrence of *Maianthemum bifolium* at Hackness. Mr. James E. Bedford exhibited numerous fine samples of plumbago from Canada. Mr. Charles Smethurst showed *Sesia philanthiformis*, *Dianthæcia cœsia*, *D. capsophila*, and *Polia nigrocincta*, from the Isle of Man. Mr. W. Turner exhibited a very good pattern of microscope, by Field and Co. Mr. S. Schofield showed a number of minerals, which were named by Mr. C. H. Bothamley. Mr. E. E. Prince showed lepidoptera from Adel, and Mr. John Grassham *Vallisneria spiralis*. Mr. Henry Pocklington, F.R.M.S., exhibited some optical apparatus, and performed some experiments illustrative of his lecture given at the previous meeting.

* We may print an extract of this Paper shortly.—EDS. NAT.

219th Meeting, August 1st, Mr. F. Greenwood and Mr. John Grassham successively in the chair.—Mr. Fairfax Wooler was elected a life member in recognition of a former gift of £5 towards the purchase of books. Specimens were shown by Mr. W. H. Taylor (ichneumonideous parasites on *Odontopera bidentata*) ; Mr. F. Greenwood sawfly larva, not determined ; Mr. W. H. Hay showed eggs of spotted flycatcher, lesser white-throat, chiff-chaff, and landrail, from within twelve miles of Leeds ; Mr. W. B. Turner showed the stamen and anther of *Tradescantia Virginica* with the microscope. Mr. Henry Crowther showed *Sirex gigas*, a male and two females, taken in Cheshire, in 1875 ; copper ores from Llandudno and Derbyshire ; argentiferous lead ores from near Penzance ; lead ores (sulphide) from Worton, Wensleydale ; Pateley Bridge ; and Trelogan mines, Llanasa, near Holywell, Wales. A series of correspondence relating to the discovery of *Maianthemum bifolium* at Hackness, near Scarbro' by Mr. James Braby, which had been forwarded to the secretary by Mr. Henry Pocklington, F.R.M.S., was read.

220th Meeting, August 8th, Mr. James Abbot in the chair.—The specimens which had been collected the day before at the Boroughbridge excursion* were shown, also the plates of Roman pavements which were presented to the Club as a reminiscence of their visit to Aldborough, by Andrew S. Lawson, Esq., (a vote of thanks being passed), and the proof of the photograph of the group of members, which was very successfully taken by Mr. J. Bottomley, of Bradford. Among the other specimens shown, were ammonites from Whitby, including *A. communis*, *A. bifrons*, *A. serpentinus*, and *A. planorbis* ; also stone containing *A. fibulatus* and small fossil shells. *Avicula decussata*, and specimens of *Helix Fraterina*, supposed to have come from Russia ; all exhibited by Mr. Henry Pollard.

221st Meeting, August 15th, Mr. H. Pocklington, F.R.M.S., V.P., in the chair.—The president, Mr. S. Jefferson, delivered a lecture on "Rotifers," illustrated by living examples under the microscope.—W.D.R.

MANCHESTER SCIENTIFIC STUDENTS' ASSOCIATION.—About 30 members of the above Association joined the usual fortnightly excursion on Saturday, under the leadership of Mr. Thomas Armstrong, F.R.M.S. London Road Station was left a few minutes after two o'clock, the party proceeding by train to Disley. A walk of a few minutes from Disley Station toward the entrance to Lyme Hall, brought the party to the wood above Lyme Park, and thence, passing through the wood, the quarries were next visited, and the botanical members at this point began their search for plants. They were not very successful, the number of specimens collected during this excursion being fewer than usual. Jackson's Edge was soon afterwards reached. From this point fine views were obtained of the

* A paper by Mr. W. D. Roebuck on this Boroughbridge Excursion will appear in our next number.

plain below and of the distant hills. The excursionists next ascended Marple Ridge. By a deep descent the Strines valley was reached, and the party, following a pleasant field-path, reached the residence of Mr. Joel Wainwright, who had with kindly hospitality invited them to tea, after which the chair was taken by Mr. Armstrong. A lecture was given by Mr. Rooke Pennington, L.L.B., F.G.S., upon some of the larger mammalia now existing in this country in a feral or wild state. Mr. Pennington described at length several animals now in existence whose prototypes existed in the far off periods of the Pleistocene age, when so many of these large and wonderful animals existed that are now extinct, and alluded to their having also existed in the Paleolithic age, and were then contemporaneous with man, and again also contemporaneous with man in the Neolithic age and the Bronze and Iron age. He specially alluded to the Irish elk, the urus, the elk, the horse, brown bear, fox, reindeer, wild ox, badger, wild cat, and several others, remarking that in these days of controversy respecting the origin of species it was specially interesting to know that in all that vast period of time there had been no change in these particular animals—that is in the wild animals—the only change being in the tame or domesticated ones. The lecturer instanced the different localities in which these various animals now existed, and showed in how many ways such facts as he adduced were important in giving us a knowledge of the fauna of the different past ages which so many are now intent upon investigating.

OVENDEN NATURALISTS' SOCIETY. — Monthly meeting, held at Illingworth, July 22nd, Dennis Wilson, vice-president, in the chair, who named the botanical specimens, which were few considering the very fine weather. They included *Sambucus nigra*, *Melampyrum sylvaticum*, *Anagallis tenella*, *Anthemis cotula*, *Pyrola minor*, and *Rubus chamaemorus*, &c. Mr. T. Hirst exhibited and named a number of foreign birds, amongst which were Moravian grebe, ring-tailed harrier, ash-backed cockatoo, green leek paroquet; also a goatsucker, shot at Castle Carr, by Mr. Eastwood. The entomological specimens were named by Mr. J. Ogden, and included a foreign bee, *Vespa synagris*, &c.—J. OGDEN, Sec.

TEES VALLEY FIELD CLUB.—This Naturalists' Field Club was established at the beginning of the present year. The district most intimately associated with the operations of the Club is sufficiently indicated by its title. The Society has formed a practical work. Its rules provide that the number of members shall be restricted to forty, and no one is to be admitted that does not take an interest in the objects of the Club. These Societies, in too many cases, have degenerated into mere pic-nic clubs, which do a very small amount of really scientific work, and the promoters of the Tees Valley Club determined to avoid this difficulty from the outset. Moreover each member will be required

to attend a meeting at least once a year, or he will become disqualified. The first president is Mr. Isaac Lowthian Bell, M.P., F.R.S. The full complement of members has already been made up. Field meetings have been held as follows :—(1) April.—The Whinston Dyke as exposed near Great Ayton. (2.) The Forcett Limestone workings near Darlington, where some interesting glaciated surfaces were exposed at the top of the limestone. (3.) High Force and Cauldron Snout, three days.—The botanists on this occasion secured about 180 species of plants in flower, including many of the rarer kinds. Many interesting specimens of igneous rocks were also obtained. (4.) Glaisdale and Egton Bridge.—The Cleveland Dyke was here seen towards its eastern range. The Rev. J. C. Atkinson, Danby, one of the vice-presidents, pointed out the scientific features of the locality. Two other field meetings will be held during the season.

WAKEFIELD NATURALISTS' SOCIETY.—August monthly meeting, Mr. Senior in the chair in the absence of the president.—Mr. Wilcock reported having taken *Veronica scutellata*. Mr. Hall exhibited *Argynnis Euphrosyne*, taken on the banks of Goole canal near the railway bridge. Mr. Fogg exhibited a fine specimen of *Sirex gigas*. Mr. Marson exhibited preserved specimens of the kingfisher, cole-tit, and common sandpiper. Mr. Senior gave an account of his late trip to Buxton and Dovedale. When relating the quantity of plants he had seen, he promised to bring some he had collected, and lay them on the table at a future meeting.

JOHN SPURLING, Hon. Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting, July 26th, Mr. Wm. Simmons in the chair. A letter was read from the secretary of the Leeds Naturalists' Club, inviting the York Society to co-operate with them and also the Richmond Club in an excursion to Boroughbridge, Aldborough, Copgrove Woods, and Staveley Carrs. After some discussion it was decided to accept their kind invitation. Mr. Helstrip exhibited an emu's egg ; Mr. Wolstenholme, eggs of the Arctic Skua (*L. parasiticus*), and mountain linnet (*L. montium*), taken by himself in the Shetland Isles. He also gave a very interesting account of those two species. Mr. R. Dutton, specimens of *Xylophasia sublustris*, *Abrostola urticæ* and *triplasia* ; also some mounted plants. Mr. Dennis, a very interesting nest of one of the humble bees, taken in a dunghill at Clementhorpe ; and Mr. Robinson, bred specimens of *Epione vespertaria*, *Eupithæcia trisignata*, and *tenuiata* ; the secretary, Mr. Prest, bred specimens of *Eupithæcia expallidata*, and *Ephyra orbicularia* ; also *Simyra venosa*, *Aplecta herbida*, and *Eupoecilia heydeniana*.—WM. PREST, HON. SEC.

MEETING August 9th, Mr. Wm. Chapman in the chair.—Mr. Webster exhibited a fine collection of plants taken during the excursion to

Boroughbridge last Monday : Mr. Simmons some fine varieties of *Zygaena filipendulae*, *Apamea ophiogramma*, *Eupithæcia subumbrata*; Mr. Dennis a box of insects taken at Llangollen, and Wallassey sand hills ; Mr. Gillar eggs of the merlin, storm petrel, great skua, Arctic skua, black guillemot, common gull, great black-backed gull, lesser black-backed gull, curlew, and eider duck, all taken by himself in Shetland ; also eggs of the gannet, taken at the Bass Rock ; Mr. Wolstenholme a curious variety of the plant *Geum rivale*, from the woods of Castle Howard ; a large *Cerambyx* beetle from South America ; and *P. vitellinae*, from osier on the banks of the Ure at Boroughbridge : Mr. Helstrip eggs of Pallas' sand grouse, *Syrrhaptes paradoxus* ; Mr. Jackson *Cucullia absinthii*, *Notodonta trepida*, and *Dianthæcia conspersa*, all bred ; also a specimen of *Eupithæcia subciliata*, taken in Cöpgrove Woods during the excursion on Monday last. The secretary, Mr. Prest, also exhibited a specimen of this local and rare species taken at the same time, and it is perhaps the first time this species has been captured in Yorkshire ; also a box of insects captured at Llangollen and Wallassey ; *Catocala nupta*, bred from the egg ; and *Agrotis Ashworthii*, bred by Mr. Greening, of Warrington. After passing a vote of thanks to the chairman, the meeting terminated.

W. PREST, Hon. Sec.

WEST RIDING CONSOLIDATED NATURALISTS' SOCIETY.—The fifth of the present year's series of excursions and meetings of this Society took place on the 5th of August. The village of Honley was the centre of the district appointed for investigation. Organised parties, under the leadership of members of the Honley and Huddersfield Societies, visited the various woods in the district ; amongst others, those of Spring Wood, Mag Wood, Honley Wood, Hare Wood, Honley Head Wood, Hagg Wood, &c., and the water sheds of part of the rivers Holme and Colne ; but the principal party started from the Huddersfield Railway Station, taking their route by way of King's Mill Bridge, a little below the confluence of the Holme and Colne tributaries of the river Calder, then by Stile common, New Laithe Hill, Hall Bower, and Castle Hill. Here the party were shown the ancient earthworks situate about 900 feet above the level of the sea, and commanding some fine and extensive views of the surrounding country, more particularly toward the north-east. Amongst the more striking objects was the spire of Ossett-street-side Church, the heights of Staincliffe, and, in the extreme distance, the still elevated ground of Rombolds Moor, &c. The ramble continued by way of Lumb, Mollicar Wood, Farnley Tyas, and Farnley Heights, reaching an elevation of 645 feet above sea level, and including within the range of vision some of the finest moorland scenery of the district, with the land-marks of Tinker's Monument and Cook's Study, &c. The various parties united at the Coach and Horses Hotel, Honley, where refreshments were heartily partaken of, after which the meeting was held, and

was presided over by J. Wainwright, Esq., F.L.S., president, of Wakefield, who gave notice, after a few remarks on the subject by Mr. G. T. Porritt, F.L.S., Mr. Joseph Tindall, of Huddersfield, and others, that at the next meeting, to be held at Whitley on the 9th of September, he should propose a resolution for the formation of a General Committee, to manage the affairs of the Society. On calling over the roll list of local Societies in the Union, the following were found to be represented :—Huddersfield, Heckmondwike, Barnsley, Wakefield, Ovenden, Stainland, Holmfirth, Liversedge, Rastrick, Mirfield, Honley, Paddock, Bradford, Leeds, and Huddersfield Literary and Scientific. A very large collection of plants were on the table, part of which were named by Mr. John Armitage, of Almondbury Bank, assisted by Mr. J. French, of Huddersfield, and Mr. R. Jessop, of Lascelles Hall. Amongst them were : *Hypericum perforatum*, *H. quadrangulum*, *Campanula hederacea*, *Pyrola rotundifolia*, *Jasione montana*, *Alisma plantago*, *Solidago virgaurea*, *Scrophularia nodosa*, *Erica cinerea*, *Lythrum Salicaria*, *Polypodium Dryopteris*, *Centranthus rubra*, *Ononis arvensis*, *Melampyrum pratense*, *Melilotus arvensis*, *M. alba*, *Fumaria officinalis*, *F. capreolata*, *Anagallis arvensis*, *Lysimachia nummularia*, *Daucus carota*, *Polygala vulgaris*, *Linum catharticum*, *Spiraea Ulmaria*, *Epilobium hirsutum*, *Erythraea centaurium*, *Inula dysenterica*, *Scabiosa arvensis*, *Knautia arvensis*, *Asperula odorata*, *Linaria vulgaris*, *Oenanthe crocata*, &c. In order to take the train, the president at this stage of the proceedings vacated the chair, when Mr. J. Sanderson, of Holmfirth, was elected to preside during the remainder of the evening. Mr. Joseph Tindall was then called upon to name the geological specimens, most of which were of a local character ; and exhibited by Mr. Isaac Exley, of Holmfirth. The fossils consisted of *Orthoceratites*, *Goniatites Listeri*, *Pecten*, and *Posidonia*. In his observations, Mr. Tindall stated that these fossils are found between the ganister coal and the 40-yards rock ; they occur in balls of iron pyrites from the roof of the ganister coal, and are indicative of the marine condition that prevailed during the deposition of the strata in which they are found. A member of the Honley Society exhibited a splendid specimen of *Calamites cannaeformis*, from the grit in Honley. Mr. Exley also exhibited two or three varieties of the genus *Helix*, and a *Clausilia*, collected during a ramble in the Craven district ; along with these molluscs he also exhibited specimens of *Encrinite* stems, called in Craven “fairy beads.” These are the beads attributed to St. Cuthbert, of Lindisfaern, and immortalized by Sir Walter Scott in his “Marmion.” Mr. T. Lister, of Barnsley, gave a full description of the birds observed during the day’s ramble, &c. The meeting was supplemented by an address from Mr. Sanderson, after which it was concluded with the usual votes of thanks. Mr. C. P. Hobkirk, of Huddersfield, and Mr. Thos. Lister, of Barnsley, were appointed to represent the Society at the forthcoming meeting of the British Association.—J. M. BARBER, Hon. Sec.

Diary.—Meetings of Societies.

- Sep. 2. Huddersfield—Paper, “The deposition of Strata in time in Britain.”—Mr. Joseph Tindall. Clayton West. Honley. Mirfield.
- “ 4. Barnsley. Stainland. Todmorden.
- “ 5. Leeds Naturalists’ Club and Scientific Association.—Exhibition of Specimens, &c. Birmingham Natural History and Microscopical Society. Bishop Auckland Naturalists’ Field Club. Bradford. Liversedge.
- “ 6. Entomological Society of London, 7 p.m. Holmfirth.
- “ 7. Wakefield.
- “ 9. West Riding Consolidated Naturalists’—Excursion to Whitley: Meeting in Church Schoolroom at 5 p.m. Middlestown. Paddock. Rippenden.
- “ 11. Brighouse and Rastrick.
- “ 12. Leeds Naturalists’ Club and Scientific Association—Paper on “The new Theory in Chemistry.”—Mr. Thomas Fairley, F.R.S.E., F.C.S. Birmingham (Botanical Section).
- “ 13. York.
- “ 16. Heckmondwike. Honley.
- “ 18. Huddersfield—Paper by Mr. George Brook.
- “ 19. Leeds Naturalists’ Field Club and Scientific Association. Birmingham (Microscopical Section). Bradford.
- “ 21. North Staffordshire Naturalists’ Field Club.—Excursion to Ludlow, Leader the Rev. T. W. Daltry, M.A., F.L.S.
- “ 23. Paddock.
- “ 26. Leeds Naturalists’ Field Club and Scientific Association. Paper on “Limestone Formations.”—Mr. Benj. Holgate. Birmingham (Geological Section).
- “ 30. Huddersfield—Paper on “Theories of Glacial Erosion,” Mr. Edward Brooke, F.G.S. Honley. Ovenden.

Communications have been received from Thomas Tate, W. D. Roebuck, W. Talbot, Bradford Naturalists’ Society, &c.

EXCHANGE.

DUPLICATES.—*Sinapis*, *Crataegi*, *Sibylla*, *Iris*, *Paphia*, *Adippe*, *Aglaja*, *Athalia*, *Artemis*, *Lucina*, *Betulae*, *Pruni*, *Arion*, *H. comma*, *Meliloti*, *Fuciformis*, *Albulalis*, *Quadra*, *Plantaginis*, *Orion*, *Turca*, *Geminipuncta*, *Conspersa*, *Venustula*, *Fuscula*, *Roboraria*, *Extersaria*, *Obscurata*, *Rusticata*, *Emutaria*, *Belgiaria*, *Plumaria*, *Nemoralis*.

DESIDERATA.—*Ichneumoniformis*, *Chaonia*, *Dictœoides*, *Carmelita*, *Cenosa*, *Elymi*, *Neurica*, *Ophiogramma*, *Lunigera*, *Obelisca*, *Agathina*, *Pyrophila*, *Lucerneæ*, *Leucographa*, *Retusa*, *Pyralina*, *Irregularis*, *Templi*, *Cœsia*, *Nigra*, *Occulta*, *Atriplicis*, *Suasa*, *Semibrunnea*, *Cordigera*, *Melanopa*, *Sulphuralis*, *Bractea*, *Festucœ*, *V. aureum*, *Interragationis*, *Anomala*, &c.—H. Goss, 8, Goldsmid Road, Brighton.

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A FIELD DAY AT ALDBOROUGH AND BOROUGHBRIDGE.

By W. DENISON ROEBUCK.

ENCOURAGED by the success which attended the August Bank Holiday Excursion to Riccall Common, in 1875, in concert with the Societies at Goole and Hull, the council of the Leeds Naturalists' Club and Scientific Association determined to repeat the experiment. In conjunction with the Richmond and North Riding Naturalists' Field Club, the Huddersfield Naturalists' Society, and the York and District Field Naturalists' Society, and supported by numerous members of other Naturalist Societies in the West Riding, an excursion took place on Monday, the 7th of August, 1876.

The excursionists numbered over a hundred in all, and included a number of the principal members of the Natural History Societies of the West Riding, from Goole, Barnsley, Halifax, Bradford, Wakefield, &c. The district embraced by the excursion included the Roman station of Isurium, the woods at Copgrove, the watery dykes and willowy "carrs" of Staveley, the "Devil's arrows" at Roecliffe, and all the country around these places, and between them and Boroughbridge; the whole district being within the drainage-basin of the river Ure (here not far from its junction with the Swale), and lying entirely to the south of the river, and within the boundary of the West Riding. In connection with the natural history, it may be well to record that the York members having to wait two hours in the morning at Knaresborough, some of the observations were made in the Nidd Valley.

The forenoon was mainly devoted to the investigation of the natural history of the district round Copgrove and Staveley, but on account of the unfavourable weather, and the great distance which some of the party had to travel, rendering the time at disposal very limited in its duration, not much was done that is worth the recording; and the chief interest which attaches to the lists given at the end of this paper arises from the fact that the district is comparatively virgin ground.

The members who visited Staveley were very courteously received by the Rev. Percival Hartley, Rector of Staveley, who showed them over the church, and other objects of interest in the vicinity.

The first assemblage was at 1-30 p.m., at the church of Boroughbridge, when the vicar, the Rev. R. D. Owen, M.A., showed the remarkable ancient Norman stone carvings, relics of the old church, preserved in the vestry of the newer edifice.

At 2-30 p.m. the members again assembled at the "Devil's Arrows"—three immense gritstone monoliths, 18, 22 $\frac{1}{2}$, and 21 feet in height, standing in a line at distances of 129 and 361 feet from each other. The most southerly one had been excavated for the occasion, to show the depth to which it was imbedded in the soil, four feet. Geologically speaking, these stones have been quarried in Plompton grit, the uppermost member hereabouts of the millstone grit series. Prof. Phillips says* :—"At Plompton great and lofty cliffs of solid rock appear, such as may have yielded the Devil's Arrows, those massive monoliths of the British settlement which preceded ancient Isurium." Plompton is eight miles from Roecliffe, but the same grit is seen in place at Lingerfield, about six miles off, the nearest point at which the stone can have been obtained.

An address upon the "Arrows" was delivered by the Rev. W. C. Lukis, M.A., F.S.A., rector of Wath, near Ripon—so well known in connection with the investigation of similar prehistoric remains in Brittany. He did not support the hypothesis given in various guide books as to their being Roman in their origin, remarking that it is not at all flattering to that highly civilized people, of whose architectural skill we have evidence in Isurium close by, to suppose that they would condescend to imitate the rude barbaric art and customs of a dark age. He pointed out that writers on prehistoric monuments have been too apt to look upon *ruins* as perfect and typical examples, and to forget the enormous amount of destruction to which all such remains are subjected. Leland spoke of four of these pillars as existing in his day, one of which was afterwards destroyed to build a bridge over a stream in the vicinity, while the northern stone shows at six feet above the ground wedge-holes, thus giving foundation for the surmise that at one time its destruction had been contemplated. Mr. Lukis then stated that in his opinion they were probably the remains of a line of pillars similar to lines which exist at Shap, in Westmoreland, in Devon and Cornwall, and also in South Brittany and other countries. Where destruction has not been carried to so great an extent as here, the plan can be discovered without much difficulty. In these cases it is found that rude blocks of stone, of no

* Quart. Journ. Geol. Soc., xxi, 235.

uniform size, have been set on end and formed into one line, or into two or more nearly parallel lines, stretching away for several hundred feet. These lines are generally oriented, but occasionally they run from north to south. In support of this supposition, set forth for the first time, Mr. Lukis pointed out that the position of the northern stone seemed to confirm the idea. It is much wider than the others, and its long axis is at right angles to the direction of the line. This exactly tallies with the systems of lines in South Brittany. There the stones increase in size as they extend from what may be supposed to have been the commencement of the lines to the other extremity, at which is found a terminating circle; and there the enormous head-stones of the lines have their long axes placed as in the case of the "Devil's Arrows." He therefore thought that the lines were constructed upon the same system as in the other countries mentioned, so that if a satisfactory explanation of the destination and purpose of any one of these systems was obtained, it would probably serve for all. That explanation, however, has yet to be ascertained, so that even if we had before us a group in a condition of unquestionable perfection, we should still be seekers for its signification.

With regard to the antiquity of the monoliths, Mr. Lukis said that nothing more can be said than that they were pre-Roman—very indefinite as that statement is. It should not be forgotten that the stones stand on ground in close proximity to an ancient British town, which afterwards became the great Roman city of Isurium, retaining its old name in a classic form. There may have been, and probably were, other megalithic monuments in this vicinity at that time, which during the long occupation of the Roman forces were converted into building materials. It is not often that great stones like these stand alone, without a number of other circumjacent monuments, telling of a long and peaceful occupation of the soil, and when they do exist we seem to be justified in conjecturing that the ground has been gradually cleared by a succession of invading peoples whose customs and manners greatly differed from those of the race who preceded them, followed by those whose religious beliefs prompted them to eradicate heathen superstition by demolishing the monuments which seemed to them to favor and encourage it.

The party then proceeded to Aldborough—the "British Pompeii"—the Iseure of the Brigantes, the Isurium of the Romans. Where the church now stands was a Roman city—not a mere camp, and the traces still to be seen, together with the numerous remains dug up

from time to time, and preserved on the spot for the inspection of visitors, combine to render Aldborough the most interesting Roman station in the kingdom. In the centre of Aldborough stands a lofty antique cross, formed of eight fluted columns, united by a foliated capital, dating from the thirteenth or fourteenth century, which formerly stood in the market-place at Boroughbridge, and is supposed to commemorate the battle in 1322, when De Bohun, Earl of Hereford, was killed while defending the bridge over the Ure at Boroughbridge, by a spear thrust a crevice in the planking.

At Aldborough, the church was first visited, the party being received there by the vicar, the Rev. R. W. Marriott, M.A., who pointed out the various objects in and about the church with a courtesy which was fully appreciated by his visitors. He first pointed out a carved figure of Mercury, built into the outside of the vestry wall, and which, supposed to be about 1500 years old, certainly dates from the time of the Roman settlement in the district. The carving, although it has not withstood the ravages of time, is still in a tolerable state of preservation. Inside the church were shown two ancient communion plates, which are supposed to have been made in the eighth or ninth century ; an ancient carving in oak of Daniel in the lion's den, and a brazen effigy (bearing the name of Wills d'Aldeburgh) of a knight in plate armour, found in one of the pews in 1827. Built into the wall of the church is a brass effigy, dated 1390, to one of the Lords of Aldborough, and near it lies a family memorial stone of the year 1475—these two dates corresponding with the original erection and earliest restoration of the church. The parish register dates as far back as the reign of Henry viii. (1538), and amongst other curious entries, contains one strongly abusive of Oliver Cromwell. Another object of interest was a sort of gravestone in the church-yard, on which was cut in relief the half-length figure of a female, the hands being clasped upon the breast in an attitude of devotion. Of this relic there are no records, but general conjecture tends to the belief that it is of Anglo-Saxon origin.

After partaking of refreshment, kindly provided by the vicar of Aldborough, a visit was paid to the grounds of Aldborough Manor, and to the "Museum Isurianum;" permission to visit which had very kindly been given by Andrew S. Lawson, Esq., the Lord of the Manor, and by his request the Rev. J. R. Lunn, B.D., vicar of Marton-cum-Grafton, author of various papers on the churches of the district, acted as cicerone during this part of the excursion.

(To be continued.)

Short Notes and Queries.

RAINFALL FOR AUGUST.—Huddersfield.—The total fall for August has been 2·09 in. (exactly the same amount as fell in July) in 10 days. The heaviest fall, 0·54 in., occurred on the 2nd. The ten years' average for August is 2·44 in., and for the first eight months of the year 19·50 in. The total for 1876 being 18·41 in., shows a season slightly drier than usual.—J. W. ROBSON, Dalton, 18th Sept., 1876.

RAINFALL IN AUGUST.—Wakefield.—During the month rain fell on 12 days, to the total depth of 1·82 in. The greatest fall occurred on the 30th, and amounted to ·34 in. On 9 days of the month the maximum temperature rose above 80° in the shade, and on the 14th it rose to 90°.—FREDK. HILL, Kirkgate, Wakefield, 18th Sept., 1876.

Tæniocampa Gothicica, var. *Gothicina*.—I should be obliged for information as to the distinguishing characteristics of this insect and *Gothica*. I obtained two specimens of *Gothicina* from Scotland; but though I flatter myself I have a remarkably quick eye for detecting the most delicate shades of colour, it puzzles me to make out any difference either in the markings or tints between the variety and the type.—JOSEPH ANDERSON, Jun., Chichester.—[The difference, as far as we can make out, is entirely one of colour, but the two are readily distinguished. In one of our examples of *Gothicina*, received from Mr. George Norman, of Forres, who first brought forward the variety (then as a separate species) some years ago, the colour is of a rosy tint, whilst the type is dark grayish purple. The variety occurs not uncommonly in this district, some specimens being even brighter and redder than the Scotch specimen alluded to.—EDS. NAT.]

CAPTURE OF *Cidaria reticulata*.—I took a specimen of *Cidaria reticulata* two or three weeks ago, at Windermere, the first and only one since 1856.—J. B. HODGKINSON, Preston, August 26th, 1876.

THE LANCASHIRE OPERATIVE BOTANISTS—A GOOD EXAMPLE.—The Botanical Societies of Tyldesley and Atherton (chiefly composed of operatives) have just inaugurated a good work which is well worthy of the imitation of similar and kindred societies. They have united their forces and formed a kind of joint stock company, in shares of £1 each. Upwards of 130 of these having been taken up by 97 members, they have secured about two acres of land, well situated for the purpose, and containing in its area a beautiful dell, which they mean converting into a botanical garden. For several months back the members have been busy every evening with spades, &c., transforming their property into banks, winding walks, and other necessaries for their purpose, and it is expected the whole will shortly be ready for planting. A cottage at the entrance to the grounds has also been included in the "take," where one of the members will reside, and act as custodian and librarian, the whole of the books of the two societies having to be located there. The meetings will be held in the grounds when practicable, and in the cottage on other

occasions :—the practice long held of meeting on Sunday evenings, and at a public-house, will now be done away with entirely. This is a step in the right direction, and we can see no reason why it should not succeed, as we hope it will, and would also commend the example to our own and other local societies.—EDS. NAT.

Reports of Societies.

BARNESLEY NATURALISTS' SOCIETY.—Meeting 4th September, Mr. A. E. Kell, C.E., in the chair.—26 beautiful varieties of the egg of the common guillemot were shown by the chairman. Three larvæ of the death's head moth (*Acherontia Atropos*) were reported to have been taken. After other business had been conducted, the members discussed the various plans for holding an exhibition of natural history objects ; the proposition was, however, withdrawn for the present, and, as a substitute, it was unanimously agreed that a course of five or six popular lectures be held during the winter months, the arrangements to be left in the hands of a committee.

JOHN HARRISON, Hon. Sec.

BRADFORD SCIENTIFIC ASSOCIATION.—On Saturday, July 29th, upwards of sixty members and friends of the Bradford Scientific Association made an excursion to the celebrated Victoria Cave, Settle. Quitting the Settle station the party wended their way through the beautiful scenery on the banks of the river to the Giggleswick Grammar School, for the purpose of inspecting the various objects of interest that have been disentombed from the Cave, and are now preserved in the school. Attention was first directed to the various finds of historic interest, including Samian and Roman pottery, after which the objects found in the neolithic layer were next exhibited. These included rude flint flakes, polished celt, bone head, barbed bone harpoon, for spearing fish in Attermere or Malham Tarn. The contents of the hyaena's den were next inspected ; the teeth of extinct elephant, the part of the rhinoceros' skull which supports the horns, bones of the bison, urus, hippopotamus, gnawed by the hyaena, with his teeth-marks distinct, and a massive skull of the grizzly bear. But the interest of this group centred in the small human bone found associated with these extinct pleistocene animals. This interesting relic, probably one of the oldest human bones that has ever been disentombed, was shown along with the cast of a similar recent leg bone from the College of Surgeons, and which had been forwarded for comparison by Prof. Busk, F.R.S., by whom most of the mammalian remains found in the Cave have been identified. The party then adjourned to the Mechanics' Hall, Settle, and after partaking of an excellent breakfast, proceeded to visit the chief attraction of the day. The Victoria Cave—so called from having been discovered on the coronation day of Her Majesty—is excavated in the face of Kingscar, a vertical

cliff of mountain limestone some 200 feet in height, about a mile from Settle. It is 900 feet higher than the adjoining river Ribble, and 1450 feet above the sea. Since 1870 the scientific exploration of the Cave has been conducted by a committee of the British Association, whose mode of work and its results Mr. Tate explained on the spot. Several yards of talus of angular fragments, weathered off the cliff, having been removed, the entrance to the cave is now completely cleared down to the pinnacles of rock jutting out of the floor, and exposing a beautiful series of arched niches, such as characterise the water caves of Craven and indicate their origin. The cutting of this trench supplied evidence of successive occupations by man, and animals strange to Yorkshire, during historic and pre-historic times. A thin dark line along the side of the trench marks the most recent occupation. Near the entrance it consisted of about two feet of charcoal, bones, and burnt flag-stones, forming the ancient hearths of men who had used the cave for a home. The bones were the remains of species of animals such as still live in Britain—the Celtic short-horned ox, the goat, pig, horse, and dog, with the occasional remains of stag, badger, and fox. The remains of the domestic fowls, introduced into this country by the Romans, supply a chronological limit in one direction, and the abundant use of the short-horned ox for food in another. For this species of ox, which is now confined to the mountains of Wales and Scotland, was the only breed of oxen reared by the inhabitants of the Brit-Welsh kingdom of "Elmete," extending from Leeds to Settle. This little kingdom was devastated by the English in 615, and the men and oxen of that period were driven westward by the ancestors of the present Yorkshire dalesmen, and had to defend themselves in the fastnesses of Wales. These facts combined enable us to say that the Cave was last inhabited by the Brit-Welsh people of the fifth and sixth centuries, who were driven from this part of the country during the troublous times of the English invasion. Six feet below this historic layer lies another bed of charcoal and ashes, presenting very different characteristics. In this lower layer we pass beyond the time when there was any knowledge of metals, to a period when ground and polished bone and stone implements were used. Bone harpoons, chipped flint tools fastened into bone handles, arrow-heads and polished stone celts mark the neolithic stage of culture. Who were these neolithic men, and whence came they? The domestic animals by which they were accompanied had never roamed wild in Britain. It was in Asia that they had been domesticated, and from that continent these neolithic men had pushed westward. They were in all probability closely allied to the Basque tribes found peopling the Iberian Peninsula and the north of the Pyrenees at the dawn of history. They had introduced domestic animals from Asia, and their bill of fare was occasionally enriched by the products of the chase, as testified by the bones of wild beasts left in the cave. Entering the cave, this layer passes insensibly into the upper cave earth,

containing the bones of Polar bear, grizzly bear, reindeer, and other northern forms. Twenty feet below the neolithic layer we come upon a bed of blue till, filled with ice-scratched boulders of limestone, silurian grits, and other far-travelled rocks. The rock striæ in the adjoining cliffs show the direction of the ice-sheet to have been from Stainforth to Long Preston, by way of Attermere Tarn, filling the ravine in front of the Cave, and blocking up the entrance by its lateral moraine. These products of the ice-sheet rested upon the upturned edges of a layer of lower cave earth, dipping inwards, enclosing a bone bed of animals, none of which now live in Britain—among them being the spotted hyæna, hippopotamus, rhinoceros, and elephant, the last two, of species now extinct, and all indicating a tropical climate. Associated with this African *fauna* was found a human bone in the same fossilised condition, proving that man inhabited these dales in pre-glacial times. Does the palæolithic Craven hunter, whose remains were dragged into this hyæna's lair, carry us back to primeval man? We think not. The cradle of the human race was away out in the east, whence the successive waves of human migration have flowed, and the remains of the earliest men must be sought, and will be found, not in the caves of Britain, but on the plains of Asia. Some of the party then provided themselves with candles, and proceeded to explore the winding chambers of the Cave. On their return, their appearance—all being almost literally covered with clay—provoked considerable merriment among the company. Afterwards the party proceeded to the Roman Camp at Attermere Tarn, and back by Scaleber Waterfall to Settle.

BRADFORD NATURALISTS' SOCIETY.—Meeting August 8th, Mr. R. Spencer in the chair.—A number of botanical specimens were exhibited. Mr. H. Andrews sent the following specimens collected by him in the neighbourhood of Lancaster :—*Parnassia palustris*, *Meconopsis Cambrica*, *Clematis Vitalba*, *Lythrum Salicaria*, &c. Messrs. J. W. Carter and J. W. W. Brook also exhibited a number of specimens, amongst which were *Geranium pyrenaicum*, *Linaria Cymbalaria*, *Campanula latifolia*, *Wahlenbergia hederacea*, &c.

MEETING Sept. 5th, Mr. J. Carter (vice-president) in the chair. The meeting was devoted to conversation and the exhibition of specimens. In botany, several were put on the table by Mr. J. W. W. Brook, including *Hyoscyamus niger*, *Origanum vulgare*, *Urtica urens*, *Senecio erucifolius*, *Thalictrum minus*, &c. Messrs. J. W. Carter and B. Illingworth exhibited a number of specimens in lepidoptera; amongst the most noted was *Noctua glareosa*. Mr. T. Roebuck read from a current number of the "Gardener's Magazine" an article on "The *Vallisneria spiralis*," written by Mr. Shirley Hibberd.—J. W. W. BROOK, Hon. Sec.

BRIGHOUSE AND RASTRICK NATURALISTS' SOCIETY.—Monthly meeting, Sept. 11th, 1876, the president in the chair. A very large proportion of

the members were present, it being understood that the question of the desirability of securing another room for the Society was to be discussed. After some discussion it was decided to take certain new premises, and a committee was chosen to look after the matter, and make what internal arrangements were necessary to adapt them to the requirements of the Society. As so much time had been taken up by other matters, the naming of the botanical specimens had to be postponed, Mr. Wentworth naming a few of the rarer ones, viz., *Centauria solstitialis*, *C. calcitrapa*, *Adonis autumnalis*, *Anthemis tinctoria*, *A. cotula*, *Pulicaria dysenterica*, *Carum carui*, *Cichorium Intybus*, *Centauria scabiosa*, and *Bidens tripartita*. The taking of new premises it is thought will be of great benefit to the Society, and will advance its usefulness ; already it has a collection of specimens and the nucleus of a library, both of which are steadily increasing.

GOOLE SCIENTIFIC SOCIETY.—The last excursion of the season was made on August 26th, to Newbald and Drewton Vale, near Brough. On their arrival at Newbald, after visiting the church—a handsome Norman structure—the party proceeded to a spot about a quarter of a mile above the village, where some copious springs of clear sparkling water issue from the base of the chalk, at a height of about 150 feet above sea level. The temperature of the springs was found to be 51° Fah., and by a rough measurement they were found to yield nearly 350,000 gallons per diem. By the springs grew *Sagina nodosa*, *Parnassia palustris*, *Menyanthes trifoliata*, *Pinguicula vulgaris*, *Anagallis tenella*, *Bartramia calcarea*, *Hypnum Kneiffii*, and other interesting plants. The road was then taken to Drewton Vale—a picturesque ravine winding up among the Wolds. At the head of this valley is a bold projecting mass of brecciated chalk, known as St. Austin's Stone, and at the bottom runs a stream similar to that at Newbald. *Atropa Belladonna* grows abundantly in Drewton Vale, to all appearance native, and *Saponaria officinalis* was found by the side of the stream, but with semi-double flowers, no doubt escaped from some garden, it having formerly been cultivated for washing purposes, as it contains a principle called *saponine*, which forms a lather with water. Between Brough and Newbald a characteristic limestone flora was observed ; the more noteworthy plants being *Reseda lutea*, *Cerastium arvense*, *Rhamnus catharticus*, *Rosa mollissima*, *Bryonia dioica*, *Cornus sanguinea*, *Pimpinella saxifraga*, *Carduus nutans*, *Carlina vulgaris*, *Chrysanthemum segetum*, *Campanula glomerata*, *Nepeta Cataria*, and *Asplenium, Ruta-muraria*. Sections were seen of the lower oolite in quarries near Brough and South Cave ; of the upper green-sand in a pit near Drewton Vale ; of the chalk marl in the bed of the stream in the vale ; and of the chalk on the Wolds ; few fossils, however, were found, and those not sufficiently well preserved to be identified. Of mollusca only *Helix virgata* and *H. ericetorum* were taken.—H. F. PARSONS, M.D., Hon. Sec.

HECKMONDWIKE NATURALISTS' SOCIETY.—Meeting August 19th, Mr. J. M. Barber, vice-president, in the chair. Specimens of local plants and fossils were exhibited, amongst which was a very good specimen of *Echinus*, found in the excavating at White Lee.

MEETING 16th September, Mr. J. M. Barber in the chair. The specimens exhibited were a number of plants, a variety of minerals, a large number of marine and a few land shells, some larvæ, and a beautifully-marked specimen of *Sphenopteris latifolia*. An iron spear-head was also exhibited, which had been found in the solid trunk of a tree. The woodpecker was reported to have been seen between Heckmondwike and Cleckheaton.—J. DEARDEN, Hon. Sec.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting August 21st, the president, Mr. G. T. Porritt, F.L.S., in the chair.—A good collection of botanical specimens, partly from Buxton and partly from this district, were laid upon the table by Mr. Joseph Tindall. In entomology the president exhibited specimens of *Petasia nubeculosa*, recently sent to him from Rannoch ; also specimens of *Nola albula*, *Ephyra orbicularia*, *Acidalia degeneraria*, and *Coremia propugnata*, all bred by himself. Mr. Samuel D. Bairstow showed a box of specimens collected by himself during the previous week at Pwllheli and Penrhyn-duduth, in Wales ; they included the beautiful pale variety of *Lomaspilis marginata*, *Ephyra porata*, *Oporabia filigrammaria*, *Chæreas graminis*, *Bryophila glandifera*, &c., the last he believed was new to Wales. Mr. Edward Taylor exhibited a living specimen of *Sirex gigas*, captured in the town on a horse's back. As the horse was apparently excessively annoyed by it, some surprise was expressed as to the reason why a purely vegetable feeder should be found in such a situation. Mr. James Varley recorded the capture of *Zeuzera cæsuli* near Almondbury Bank. This was the first record of its occurrence in the district. Mr. J. R. Dore then read a paper on "The Chameleon," giving a history of the habits and peculiarities of this singular reptile, dwelling more particularly on its well known characteristic habit of changing colour. This he attributed entirely to the action of light and atmospheric influences, and not in any way to the will of the reptile ; this was easily proved by placing a specimen in such a position that light could have full play on one part of the body, but not any other, &c.—A discussion ensued.

MEETING September 2nd, the president in the chair.—Mr. Henry M'Kenzie exhibited a fine fossilized example of some species of coral from Gwrych Castle, Abergeldie. The botanical specimens included *Polystichum aculeatum*, *Hypericum Androsænum*, &c., shown by Mr. M'Kenzie ; *Statice armeria*, *Plantago maritima*, and others from the Isle of Man, by Mr. Joseph Copley ; *Meum athamanticum* from Oakleigh Hill, Stirlingshire, by Mr. Allan Godward. In ornithology Mr. Joseph Tindall

recorded having seen 80 to 100 pied wagtails running about Fitzwilliam Street, in the town, early on the morning of the 24th August ; the atmosphere was cold and frosty at the time. In entomology Mr. Charles Shaw exhibited the Colorado potato-beetle ; also mosquitoes from America. Mr. John Conacher, *Plusia festucæ*, taken by himself at Perth, and *Thecla W-album* from Edlington Wood. Mr. S. D. Bairstow, *Polia chi*, var. *olivacea*, from High Hoyland. The president recorded the capture, on tansy in his garden at Highroyd, of *Pterophorus ochroductylus*, a species entirely new to the district ; he also exhibited a fine specimen of a locust (species not determined) which had been taken a fortnight or more previously, in one of the streets in the town ; he remarked that a similar example had been taken at Bradford about the same date, from which it would appear that a flight had come over to this country. The secretary, Mr. George Brook, presented the last volume of Macmillan's "Science Primers," and Alcock's "Botanical Names for English Readers," to the library of the Society. The sixth annual report of the Leeds Field Club and Scientific Association had also been received from the secretary of that Club. Mr. Joseph Tindall delivered a lecture on "The deposition of Strata in time in Britain." The title of the lecture sufficiently indicates its character ; with the aid of a long series of admirably-executed diagrams, Mr. Tindall handled his subject in an interesting and most lucid manner.—G. B.

LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—222nd Meeting, August 22nd, 1876. Mr. Henry Pocklington, F.R.M.S., vice-president, in the chair. Mr. William Nelson, showed a large number of examples of the common *Helix nemoralis* and its variety *hortensis* to show the large amount of variation attained by this species. Mr. E. E. Prince exhibited five species of lepidoptera,—*Arge Galathea*, *Lasiommata Megæra*, *Hipparchia Semele*, *Polyommatus Corydon* and *Ourapteryx sambucata*,—taken near Dorchester. Mr. Henry Pollard showed *Bithinia tentaculata*, taken in the canal at Newlay. Mr. John Grassham showed specimens of *Bombyx Pernyii*, and other insects. On behalf of Mr. James Abbott were shown a number of specimens of a beetle, *Mezium sulcatum*, which had been found in powdered ginger. The beetle is commonly found in cupboards in Leeds, and often very far from any possible article of food.

223RD MEETING, August 29th, Mr. Samuel Jefferson, F.C.S., president, in the chair.—Mr. Henry Crowther exhibited a box of Dragon-flies, well set, but unfortunately not named : also a small wasp-nest from Cheshire; and Queensland mosquitoes, sent over this year. Mr. Charles Smethurst showed two marine shells from the Isle of Man, *Littorina rudis* and *L. obtusata*; *Polia nigrocincta*, bred from larvæ from the Isle of Man ; *Xanthia silago*, bred from larvæ from Adel Moor ; *Cidaria prunata*, taken sparingly at Bishop Wood ; and other lepidoptera from the neighbourhood. Mr. Benjamin Holgate brought a nodule of clay ironstone from

York road, Leeds, containing *Anthracosia*. Mr. Walter H. Hay showed a fine series of eggs of sea-birds, including the razor-bill, the guillemot, the shag, the cormorant, the gannet, the lesser black-backed gull, the kittiwake gull, the lesser tern, and the common tern. Mr. W. H. Taylor showed a species of remarkable beetle, which he considered to be *Campylus linearis*, one of the Elateridæ, or skip-jacks. Mr. William Nelson showed specimens of *Helix pisana* from Tenby, Jersey, Guernsey, and Cannes (France); also the new variety *atro-purpurea* of *Paludina vivipara*, found at Pont-y-pool, Monmouthshire, by Mr. R. M. Lloyd, of Birmingham, and first described by him in the "Quarterly Journal of Conchology," published in Leeds by Mr. John W. Taylor. Mr. S. Scholefield exhibited a snake of the common species, taken in 1867 near Bradford, also several local plants—*Glycyrrhiza glabra* from Pontefract, *Lythrum Salicaria* from wet ponds at Walton, and *Thalictrum flavum* from Boston Spa. Mr. John Grassham exhibited the egg of a woodcock, which had bred this season in Stainbro' wood, near Barnsley, also several lepidoptera—*Sesia bembeciformis*, *S. apiformis*, *Macroglossa stellatarum*, *Epione vespertaria*, and larvæ of *Bombyx Cynthia*, and *B. cecropia*.

224TH MEETING, Sept. 5th, 1876, Mr. Thomas Tate in the chair.—Several valuable donations to the library were announced, and thanks voted to the donors. Mr. Charles H. Bothamley showed some minerals, including Witherite (baric carbonate), fibrous and opaque; the same, crystalline and nearly transparent, from Lothersdale; Barytes or heavy spar (baric sulphate), from Patterdale; Quartz (silica) crystallised, from Cumberland; and milk-white quartz (opaque and amorphous) from Queensland. Minerals were also brought by Mr. Henry Pollard, including quartz crystals, from Wheal Uny, St. Ives; various copper ores, as redruthite, from Wheal Bassett, and nail-headed copper ore from St. Ives; Iron pyrites from Dolcoarth and Carnbrea; wolfram from East Pool; and chalcedony from Pednan-drea: all collected in Cornwall by Mr. Edward A. Moore. Mr. Henry Crowther brought *Carlina vulgaris* from Wentbridge, and three species of *Sigillaria*; *S. organum* from Altofts, near Normanton, *S. tessellata*, from Shipley, and *S. alternans* from the Barnsley coal-measures. Mr. Thos. Tate showed the "locust" taken at Thornbury, near Bradford, and reported in the local newspapers about the 24th of August.

225th MEETING, Sept. 12th. Mr. James Abbott, vice-president, in the chair. A number of valuable donations to the library from kindred societies were announced, and thanks voted to the donors. Mr. Thomas Fairley, F.R.S.E., F.C.S., public analyst to the borough of Leeds, then delivered an interesting lecture on "The New Theory in Chemistry," illustrated by experiments and apparatus. He referred to the vague notions relating to the constitution of matter, found in the writings of many ancient and modern philosophers, and showed how in recent times the molecular theory has been generally adopted. He described the proofs in favour

of the existence of molecules derived from the processes of solution of solid bodies, the condensation of gases, the evaporation of liquids, and other phenomena of heat and light, all of which confirm the idea that matter consists of exceedingly small particles diffused through the space apparently occupied by it. He gave the results of the calculations made respecting the size, number, and velocity of these particles in the case of certain kinds of matter. The lecturer proceeded to explain the difference of meaning now attached to the terms "molecule" and "atom," especially in their application to the chemical phenomena relating not merely to the composition of substances, but to the probable arrangement of the atoms in them. Finally he referred to the great importance of measuring the heat liberated during chemical actions, since the heat is strictly equivalent to the chemical force called into play in any given case. At the close of the lecture Mr. Fairley exhibited and described new compounds discovered by him since the date of his last lecture before the Society, and also new and more perfect apparatus for the exact measurement of the heat liberated during certain chemical actions which he is now investigating. A vote of thanks concluded the meeting.—W. D. R.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting at Illingworth, August 19th, Mr. Roger Earnshaw, vice-president in the chair.—A great number of botanical specimens were laid on the table, which were named by Mr. Dennis Wilson, including *Scutellaria minor*, *Lysimachia vulgaris*, *Sparganium ramosum*, *Veronica Beccabunga*, *Scabiosa succisa*, *Betonica officinalis*, *Fragaria vesca*, *Achillæa ptarmica*, *Lamium purpureum*, *Senecio aquaticus*, *Erica cinerea*, *Angelica sylvestris*, *Lotus major*, *Eupatorium Cannabinum*, and *Epilobium palustre*. Mr. T. Cockcroft exhibited a few geological specimens from the new railway cutting, Queensbury, and from Ringby quarries *Cardiocarpons*, *Pectens*, *Halonia regularis*, &c. Mr. T. Hirst exhibited and named a number of foreign birds, including the Chinese golden pheasant, and a pair of long-tailed sparrows from the Cape of Good Hope, three sun birds (one the red-breasted sun bird), guillemot, kittiwake gull, green-fronted paroquet, and ash-backed cockatoo, shot at Thornton. Mr. J. Ogden named the specimens in entomology, which included a splendid stag-beetle, *Lucanus cervus*, sent from Kent, and various lepidoptera.—J. OGDEN, Sec.

RICHMOND AND NORTH RIDING NATURALISTS' FIELD CLUB.—Monthly meeting Sept. 4th. Mr. Roberts, vice-president, in the chair. Mr. Falconer exhibited male and female specimens of the saw beetle, *Coleoptera lucanides*, from Dominica, well preserved; length of body six inches, outstretched wings ten inches. Mr. Hibbert exhibited specimens of Derbyshire spars and sulphate of barytes from Ireland. Mr. Durham, of Dalbeattie, presented to the museum a Roman medal of St. Paulinus. Mr. John Hauxwell, the curator, exhibited a case containing several varieties of the humming bird, *Trochiledæ*, in excellent preservation, and

arranged with much skill and taste. Mr. Swarbreck, of Bedale, left on the table of the museum "The Military Antiquities of the Romans in Britain." The case of humming-birds will also remain in the museum for a short time.

TEES VALLEY FIELD CLUB.—Meeting and Excursion 2nd September.—This meeting was chiefly of archæological interest, the places visited being Barnard Castle, Egglestone Abbey, Greta Bridge, Scargill Wood, Brignall and Bowes, the locality of "Do the Boys Hall" of Dickens' "Nicholas Nickleby." The botanists, however, did not neglect collecting, some 85 plants in flower being gathered during the day.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly meeting, Sept. 7th, the president in the chair.—Mr. Fogg exhibited *H. petasites*; Mr. Lumb, eggs of the black-headed bunting, grey bunting, a variety of the eggs of song thrush, and a number of others; Mr. Wilcock a specimen of *Veronica scutellata*, and a box containing a large number of *Coleoptera*; Mr. Talbot a living locust taken in the prison yard. It was also proposed that the following books be bought and added to the library:—Morris's "British Birds, Nests, and Eggs"; Rye's "Coleoptera"; Smith's (British Museum) "British Bees."—J. SPURLING, Hon. Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Meeting 13th September, Mr. R. Cooke in the chair.—Mr. Ripley exhibited heads of the Thar, Gerow, and Musk deer (shot by Mr. R. D. D. Wilson, Bishopton, Ripon, and Major Craster, Otterington House), from the snowy mountains of India, and very rarely shot by Englishmen; a fine specimen of the knot (*Tringa canutus*), a rare British bird taken near Rillington Station. The knot is a native of the high latitudes of Europe and America, and frequents our shores in the autumn; also a fine specimen of the common sandpiper, taken from a large pike, which had evidently bolted the bird alive. The fish was captured by a gentleman residing at Birdsall, near Malton. Mr. Gillar: eggs and down of the Eider duck (*Anas mollisima*), taken by himself in the Shetland Isles. Mr. C. D. Wolstenholme: eggs of the scoter (*Anas perspicillata*), little crake (*Crex pusilla*), and a fine fresh specimen of *Colias edusa*, taken by himself near Tuxford railway station, August 21st. Mr. Wm. Simmons: a specimen of *Sirex gigas*, taken at Strensall; also *Cymatophora fluctuosa*, dark specimens of *Gnophos obscurata*, *Eupithæcia succenturiata* and *subciliata*, *Lobophora viretata*, *Limacodes asellus*, *Lythria purpuraria*, and *Eupæcilia implicitana*. Mr. Robinson: living larvæ of *Acidalia imitaria*. Mr. Potter: a collection of rare mountain plants, taken by himself in the South Tyrol in 1875. The secretary (Mr. Prest) living larvæ of *Hadena rectilinea*; a specimen of *Aplecta occulta*, taken at Sandburn, near York, and very rare in this county; *Vanessa Antiopa*, taken at Castle Howard in 1872; and a fine series of *Lucanus cervus*, the stag beetle from Reading.—W. PREST, Hon. Sec.

WEST RIDING CONSOLIDATED NATURALISTS' SOCIETY.—The sixth excursion meeting of this Society took place Sept. 9th. Though heavy showers continued to fall at intervals during the day, there was a good attendance of members. The country investigated lay round Lower Whitley, the route taken by the various parties being from Ravensthorpe by way of Whitley Woods ; from Mirfield by way of Hopton, Liley Lane, and Upper Whitley ; from Kirkheaton by way of Hagg Hill, &c. One of the principal places visited was Hopton New Hall, the residence of Mrs. Marriott, where the conservatories, &c., were open for the members to inspect. The Hall is a light and elegant fabric, in the early English style of architecture, and the grounds are all laid out with great taste. The Hopton woods, as well as those of Whitley, contain some rather rare plants, &c., some of which were gathered on the occasion. The most interesting place visited during the ramble perhaps was Whitley Hall, the residence of E. A. Leatham, Esq., M.P., with its extensive park and woods. This estate was in the possession of the ancient family of the Bellomontes—now Beaumonts—in the reign of Henry III. The oldest part of the present hall was built in the reign of Elizabeth by Sir Richard Beaumont ; it was considerably enlarged in 1704, and with several additions since made, forms a large quadrangular building, with court-yard and two fine fronts. On the western side of the principal front stands the family chapel, formerly noted for the finely carved oak fittings of the style or workmanship of Gibbons. From a small temple situate in an elevated part of the park is obtained a fine view of part of the western moors, looking towards Blackstone Edge, &c. The different investigating parties united about five o'clock at Whitley Lower, when, having partaken of refreshments, the whole company adjourned to the Church School, where tables had been arranged with the various collections made during the afternoon. The president (J. Wainwright, Esq., F.L.S., of Wakefield) occupied the chair, and the Rev. W. Fowler, M.A., vicar of Liversedge, the vice-chair, supported by the other officers of the Society, Mr. J. M. Barber, of Heckmondwike, and Mr. W. D. Roebuck, of Leeds, the honorary secretaries. The president briefly addressed the meeting, informing the members that in consequence of arrangements he had made for visiting Palestine, Egypt, &c., he would not be able to be with them at their next meeting, but assured them that in whatever part of the world he might be at the time, he should think of them and their proceedings, which he hoped would be carried out for the benefit of the Society. He had given notice at the last meeting that he should that day bring forward two resolutions materially altering the present constitution of the Society, but having been informed by the hon. secs. that it was very unusual to bring forward business that would alter the "constitution" of the Society excepting at the annual meetings, he would leave his proposition with the vice-chairman to bring forward then. After referring to the unfavourable state of the weather for excursions, and the

difficulty of making collections under the circumstances, he called upon the annalist for the minutes of the last meeting. Representatives from the following societies were present :—Huddersfield, Heckmondwike, Wakefield, Ovenden, Stainland, Holmfirth, Liversedge, Rastrick, Mirfield, Middlestown, Bradford, Leeds, Goole, Selby, and the Huddersfield Literary and Scientific Society. The botanical specimens, numbering upwards of 80 species, were named by H. F. Parsons, Esq., M.D., of Goole, and the Rev. W. Fowler, the rarest being *Wahlenbergia hederacea*, *Ophioglossum vulgatum*, *Triglochin palustre*, *Gentiana Amarella*, *Mercurialis annua*, *Actaea spicata*, *Rubus glandulosus*. The fungi included—*Polyporus squamosus*, *Phallus impudicus*, *Marasmius oreades*, *Agaricus semiglobatus*, *A. separatus*, *A. fascicularis*, *A. campestris*, *A. pascuus*, and *Coprinus niveus*. Dr. Parsons, in naming the fungi, gave some interesting and useful information respecting them, pointing out the chief features by which the edible and the poisonous species might be distinguished. The specimens of conchology produced were named by Mr. J. Neville, of Mill Bridge, and the mineralogy by Mr. J. Tindall, of Huddersfield. In consequence of the unfavourable state of the day, but few specimens of entomology were collected ; these were in the larva and imago states, exhibited by Mr. Jas. Varley, of Almondbury Bank, and named by Mr. G. T. Porritt, F.L.S., of Huddersfield. Amongst other specimens was a fine locust found in Wakefield, and exhibited by Mr. W. Talbot, which led to several reports of locusts having been captured in other parts of Yorkshire. Mr. W. Talbot of Wakefield, Mr. C. C. Hanson of Stainland, Mr. W. Stoks of Hopton, and other members reported on the birds seen and heard during the day, amongst which were the swift, the swallow, the house and the sand martin ; the kingfisher had been seen on the Calder, indicating that fish might still be found there, which has since been verified. Mr. J. Sanderson, of Holmfirth, exhibited a curious egg, produced by a pheasant hen. Conversation and discussion ensued, when the chairman reminded the members that the next gathering would be the annual meeting, and would take place on Saturday afternoon, the 7th October, in the Battyeford Church School, Mirfield, near Cooper Bridge station. Votes of thanks were then passed to the Rev. H. and Mrs. Bullivant for the use of the school-room ; to Mrs. Marriott, of Hopton New Hall ; and to E. A. Leatham, Esq., M.P., for their kindness in allowing the members to ramble and collect specimens in their grounds ; also to the president, of whom the members took a cordial farewell.—J. M. BARBER, Hon. Sec.

N.B.—Owing to a great pressure of matter for this month's issue, we have been unwillingly obliged to condense several of the Reports of Societies, and to postpone Mr. Talbot's "Birds of Wakefield" and other papers until our next issue.—EDS. NAT.

Diary.—Meetings of Societies.

- Oct. 2. Barnsley. Stainland. Todmorden Botanical Society.
,, 3. Leeds Naturalists' Club and Scientific Association.
 Bradford. Bishop Auckland. Liversedge.
,, 4. Entomological Society of London, 7 p.m. Holmfirth.
,, 5. South London Entomological Society. Wakefield.
,, 6. Royal Microscopical Society of London, 8 p.m.
,, 7. West Riding Consolidated Naturalists'—Mirfield or
 Cooper Bridge Stations for Annual Meeting in
 Battyeford School-room, at 5 p.m. Clayton West.
 Mirfield. Paddock.
,, 9. Rastrick and Brighouse.
,, 10. Leeds Naturalists' Club and Scientific Association.
,, 11. York.
,, 14. Heckmondwike. Honley. Middlestown.
,, 16. Huddersfield Naturalists'—Paper: "British Mammalia,"
 Mr. Wm. Nettleton.
,, 17. Leeds Naturalists' Field Club and Scientific Association.
 Bradford.
,, 19. South London Entomological Society, 8 p.m.
,, 20. North Staffordshire Naturalists' Field Club.—Excursion
 to Burton-on-Trent, in connection with the Dudley
 Club : Leader, W. Molyneux, F.G.S.
,, 21. Paddock.
,, 24. Leeds Naturalists' Field Club and Scientific Association.
,, 28. Huddersfield Naturalists'—Paper: "The British Pyrales,"
 Mr. G. T. Porritt, F.L.S. Ovenden. Honley.
,, 31. Leeds Naturalists' Field Club and Scientific Association.

Communications received from W. Talbot, Jas. Varley, George Parkin, &c., unavoidably stand over.

EXCHANGE.

DUPLICATES—*Edusa*, *Hyale*, *H. Comma*, *T. Quercus*, *Argiolus*,
Egon, *Progemmaaria*, *Amataria*, *Piniaria*, *Graminis*, *Diffinis*, *Puta*
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NOVEMBER, 1876.

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THE BIRDS OF WAKEFIELD :

With particulars of the occasional visits of Rare Species, and of those that have been observed to breed in the neighbourhood,

FROM 1845 TO THE PRESENT TIME.

BY WILLIAM TALBOT.

SCOLOPACIDÆ.

BLACK-TAILED GODWIT (*Limosa melanura*)—

In January, 1870, one was picked up in an exhausted state by a platelayer, near Featherstone Station.

WOODCOCK (*Scolopax rusticola*)—

They vary in numbers according to the season, whether it be favourable or not to their flight. I have two in my collection, one was shot on the 21st of September, 1851, and the other was caught in a rabbit-trap on the 30th of March following. They differ much in plumage : the former is almost a uniform shade of light brown, or rufous, whilst the latter is a light ash colour mingled with rich brown and black.

COMMON SNIPE (*Scolopax gallinago*)—

Is moderately plentiful in winter time, and a few occasionally remain to breed here.

JACK SNIPE (*Scolopax gallinula*)—

Visits us every winter, but it is not so numerous as formerly.

CURLEW SANDPIPER (*Tringa subarquata*)—

One has been shot at Stanley Ferry, one at Kirkthorpe, another at Horbury, and one at the lower reservoir at Cold Hiendley.

KNOT (*Tringa Canutus*)

Shot at the above reservoir in September, 1868, by Mr. G. W. Marsden, and is now in his collection.

LITTLE STINT (*Tringa minuta*)—

Mr. Marsden shot two out of a flock at Cold Hiendley, and they are now in his possession ; three were also killed at Horbury Bridge, and were sent to Mr. G. Lumb to preserve.

DUNLIN (*Tringa variabilis*)—

One or two are shot nearly every spring at the above reservoir.

GREY PHALAROPE (*Phalaropus lobatus*)—

This bird was shot in September, 1861, by Mr. R. Abbott, in the Calder, at Kirkthorp, and is now in the possession of Mr. W. H. Gill. Mr. Illingworth, of Horbury, informs me that he had two handed to him to preserve, which had been shot near Horbury.

RALLIDÆ.

LAND-RAIL (*Crex pratensis*)—

Is moderately plentiful, but not so abundant as formerly. I have seen as many as forty-one sent to Mr. Wright, bird stuffer, in one season. My earliest date of the arrival of this migrant is 9th of April. Several have been shot here as late as the end of September.

SPOTTED CRAKE (*Crex porzana*)—

Several have been found in this neighbourhood which had been injured by flying against the telegraph wires; one a remarkably fine spotted one was found in Ing's Road, and presented to Mr. Parkin.

LITTLE CRAKE (*Crex pusilla*)—

Several have shared the same fate as the above, and have found their way into the hands of local collectors.

WATER RAIL (*Rallus aquaticus*)—

Was formerly very common in this district, but now it is rarely met with. I have a pair in my collection shot in the streams at Agbrigg.

MOORHEN (*Gallinula chloropus*)—

This bird is very plentiful.

LOBIPEDIDÆ.

Coot (*Fulica atra*)—

Breeds abundantly at Nostell dam and Cold Hiendley reservoir. It also breeds at Newmiller dam, Woolley dam, and Bretton dam. I have spent much time in observing the habits of water-fowl during the last nine years, and I invariably find this bird to be of a quarrelsome disposition, and given to interfering with its neighbours. I should not, therefore, look upon it with much favour if I wished to encourage the breeding of wild ducks upon a lake.

ANATIDÆ.

WHITE-FRONTED GOOSE (*Anser albifrons*)—

Scarcely a winter passed between 1847 and 1856 without two or three being shot either at Stanley, Newland, or the old Calder, but since the latter date I have only seen two specimens.

BERNICLE GOOSE (*Anser leucopsis*)—

Three of these birds have come under my notice, which had been shot on the Calder since 1849; they had probably strayed from some of the ornamental waters in the district.

BRENT GOOSE (*Anser brenta*)—

Several have been killed at Stanley Ferry, Newland, and Patterdale. Nearly every winter I see flying eastwards flocks of small geese, which approach so near the ground that, with the aid of a field-glass I have had no hesitation in setting them down to be the brent.

CANADA GOOSE (*Anser canadensis*)—

Breeds every year at Nostell Dam; the keeper informs me he has observed that several pairs usually leave the dam at the commencement of the breeding season, and return again in autumn. They may often be found feeding in stubble and seed-fields about Santingley and Wintersett. I have met with them at the reservoir at Cold Hiendley, and three times I have seen them at Woolley Dam.

MUTE SWAN (*Cygnus olor*)—

I have seen two which had been caught alive, and three shot on the Calder. I have little doubt that they had escaped from the private lakes in the neighbourhood.

COMMON SHIELDRAKE (*Tadorna vulpanser*)—

Four visited Cold Hiendley reservoir in 1864; one was shot by the keeper and sent to Mr. Lumb, of Wakefield to be stuffed.

SHOVELLER (*Anas clypeata*)—

This is an occasional winter visitor. In the years 1871–2–3 several were killed on the Calder and at Cold Hiendley.

WILD DUCK (*Anas boschas*)—

Is abundant with us in winter; a few stay to breed in the summer at Haw Park and Nostell.

TEAL (*Anas crecca*)—

Visits this district every winter, but it is not so abundant as formerly.

WIGEON (*Anas penelope*)—

Is very plentiful, particularly in mild winters, at Cold Hiendley, Woolley, and on the Calder.

SCOTER (*Oidemia nigra*)

Several have been shot at Cold Hiendley : I have also seen birds shot at Thornes, Horbury, and Healey.

POCHARD (*Fuligula ferina*)—

Is met with every winter ; in open seasons it is rather numerous.

SCAUP DUCK (*Fuligula marila*)—

Is plentiful at Nostell, Newmillerdam, and on the Calder. I have met with it at Woolley and Bretton dams. Mr. Ianson has in his collection some very fine specimens, which he shot at Cold Hiendley.

TUFTED DUCK (*Fuligula cristata*)—

Not uncommon in this district ; I hear of them being shot every winter.

GOLDEN EYE (*Fuligula clangula*)—

This is also not uncommon ; Mr. Marsden and Mr. Ianson have frequently shot specimens at Cold Hiendley.

SMEW (*Mergus albellus*)—

In December, 1871. I saw a male bird at Nostell Dam, and again in February, 1873, I saw another at the same place. Its beautiful white plumage renders the smew very conspicuous, and clearly distinguishes it from other species of duck.

(*To be continued.*)

A FIELD DAY AT ALDBOROUGH AND
BOROUGHBRIDGE.—*Concluded.*

By W. DENISON ROEBUCK.

IN addition to ancient Samian ware, spoons, dice, and coins, from the time of Nero to Maximus, the museum contains splendid specimens of tesselated and mosaic pavements, which formed the flooring of some of the apartments in one of the Roman mansions. Two pavements in good and almost perfect condition were also to be seen in the garden of the Aldborough Arms.

In the grounds of the Manor were seen portions of the boundary walls of the Roman city, and the quarries which furnished the building stone for the Romans.

Before leaving the Manor, the members were grouped together with the "Tower" and the "Museum Isurianum" in the background, for the purpose of being photographed. This was very well done by Mr. Joseph Bottomley, of 72, Market-street, Bradford; his success being the greater as the group contained between 90 and 100 faces.

Tea was served at the "Crown" and "Malt Shovel" Hotels, Boroughbridge, preparatory to the return journey.

In addition to the clergymen and others mentioned, the excursionists were during the day much indebted to the Rev. F. S. Sykes, vicar of Dunsforth, to Mr. J. W. Green, of Boroughbridge, and to Mr. T. S. Turner, of York. It would be invidious to single out names from among the members of the different Societies present, but it may be mentioned that the following societies were represented by their presidents:—Richmond (Mr. J. M. Bradley, J.P.); Leeds (Mr. Samuel Jefferson, F.C.S.); Huddersfield (Mr. George T. Porritt, F.L.S.); Wakefield (Mr. Joseph Wainwright, F.L.S., president also of the West Riding Consolidated Naturalists' Society); Barnsley (Mr. Thomas Lister); and by other of their most active members.

In giving the following lists it must be remembered that almost their only interest lies in the fact of the locality being almost virgin ground, very little information on the subject of the fauna and flora of the district being on record. In such cases it is necessary that even common species should be enumerated, in giving a list for the first time. The weather, although in good condition as far as regards the physical comforts of the excursionists, was yet against any success in the collection of insects, &c., and the necessarily limited amount of time, combined with the large extent of country and the numerous objects of archaeological interest, rendered it very improbable that any very large amount of natural history work could be accomplished.

Observations on the ornithology of the district were made by Messrs. T. Lister and Wm. Talbot, of Wakefield, and other members, Mr. Lister reporting that of summer migrants, the swallow, martin, and swift were all most abundant, especially over the Ure at Boroughbridge, and the Nidd at Knaresborough, while the sand or bank martin, the willow warbler, redstart, and spotted flycatcher were

observed. Of resident birds were noticed the yellow-hammer, common wren (the only birds that sang), thrush, blackbird, green-finches, pied wagtail, rook, chaffinch, blue tit, great tit, spotted flycatcher, coot, partridge, long-tailed tit, ring-dove, kingfisher, golden-crested wren, sparrow, robin, jackdaw, wild duck, skylark, and water hen or moor hen—the totals being eight summer migrants and 23 resident birds.

Messrs. William Nelson and John W. Taylor, of Leeds, who were the leaders of the conchological party, report that owing to the extent of ground covered by the excursion, the necessarily limited time did not allow of much close searching. The following species were seen during the day by various members of the party:—In ponds at Staveley, specimens of *Bithynia tentaculata*, *Planorbis albus*, *P. contortus*, *Physa fontinalis*, *Limnæa peregra*, *L. palustris*, and *Ancylus lacustris* were obtained. From various other places in the vicinity examples of *Arion ater*, *Limax agrestis*, *Succinea putris*, *Vitrina pellucida*, *Zonites cellarius*, *Z. alliarius*, *Z. nitidulus*, *Z. purus*, *Z. crystallinus*, *Helix aspersa*, *H. nemoralis*, *H. hortensis*, *H. Cantiana*, *H. rufescens*, *H. hispida*, *H. caperata*, *H. rotundata*, *H. pulchella*, *Vertigo pygmæa*, *Clausilia rugosa*, *Cochlicopa tridens*, *C. lužrica*, *Achatina acicula*, and *Planorbis nitidus*.

In entomology the specimens were collected by the Rev. G. P. Harris, of Richmond, Messrs. G. T. Porritt, F.L.S., and S. D. Bairstow, of Huddersfield, Messrs. W. Prest and W. Simmons of York, and others, but owing partly to the want of time and partly to the unfavourable weather, very little was done. One species, however, turned up which was new to the county of Yorkshire. This was *Eupithecia subciliata*, which was first taken by Mr. Charles Smethurst, of Leeds, who captured two specimens in Copgrove woods; other two were taken by Mr. Jackson, and one by Mr. William Prest of York. Mr. Prest stated that among the species observed were *Pieris napi* (unusually large specimens), *Liparis auriflava*, *Abraxas grossulariata*, *Epione apiciaria*, *Acidalia bisetata*, *Coremia unidentaria*, *Camptogramma bilineata*, *Cidaria fulvata*, *Eubolia mensuraria*, *Goneptera libatrix* (larva), *Tryphæna pronuba*, *Scopula lutealis*, *Crambus tristellus*, *C. culmellus*, *Dictyopteryx Forsksleana*, *Argyrotoza Conwayana*, *Phoxopteryx Mitterbacheriana*, and *Pterophorus fuscodactylus*. Mr. Grassham, of Leeds, took a batch of larvæ of the buff-tip moth (*Pygæra bucephala*). None of these insects can be considered rare, and the list is a very poor one.

Plants were collected by Mr. James Abbott of Leeds, Mr. Webster of York, and others. Their lists included *Ranunculus hederaceus*, *Nymphaea alba*, and *Nuphar lutea* in pond at Staveley; *Stellaria nemorum*, *Cerastium aquaticum*, *Hypericum perforatum*, *H. montanum*, *Hippuris vulgaris*, *Myriophyllum spicatum*, *Lythrum Salicaria*, *Bryonia dioica*, *Pimpinella Saxifraga*, *Sium angustifolium*, *Silanus pratensis*, *Myrrhis odorata*, *Lonicera Xylosteum*, *Valeriana dioica*, *Hieracium vulgatum*, *Eupatorium Cannabinum*, *Solidago Virgaurea*, *Senecio Erucifolius*, *Anthemis arvensis*, *A. cotula*, *Campanula latifolia*, *Veronica Anagallis*, *Scrophularia nodosa*, *Verbena officinalis* (Scriven), *Echium vulgare*, *Hottonia palustris*, *Lysimachia vulgaris*, *Samolus Valerandi*, *Chenopodium Bonus-Henricus*, *Rumex Hydrolapathum*, *Salix Smithiana?* *Lemna minor*, *Scirpus lacustris*, *Carex pendula*, *Glyceria aquatica*, varieties of *Lastraea filix-mas* and *Equisetum maximum*. The Leeds Society was also much indebted to Mr. J. W. W. Brook, secretary of the Bradford Naturalists' Society, for information on the flora of the district at another season of the year.

With regard to the geology of the district, Mr. Thomas Tate, of Bradford, states that the district explored is bounded on the west by a well-marked ridge of magnesian limestone, ranging from Knottingley, through Knaresbro', to Ripon, rising to an average height of between 200 to 300 feet above the sea. Passing through Knaresbro' station, the party obtained a lovely peep along the banks of the Nidd below the castle ruins; the junction of the carboniferous grit with the overlying magnesian limestone being well in view.

Copgrove and Staveley are built upon the magnesian beds, but the latter are completely hidden by the boulder clay save in two sections exposed in the railway cutting.

Eastward of Staveley the limestone dips under, and is succeeded by the lowermost member of the triassic series—the Bunter sandstone. Sections of this were seen in two quarries within the grounds of Aldborough Manor, near the museum; one of which had supplied the Romans with the building materials for Isurium. Another section has been exposed in lowering the road near the junction of the York and Tadcaster turnpikes, but here, as elsewhere, it is non-fossiliferous. With these exceptions, the entire area is covered by a thick deposit of boulder clay crowded with faintly ice-scratched pebbles from a distance; the granites and syenites of the lake district, and the carboniferous limestone of the Pennine range being the most abundant.

ELEVEN DAYS IN CUMBERLAND.—(Concluded.)

By JAMES VARLEY.

We then went on to the Shaws Hotel, a magnificent edifice, which was erected at a cost of £10,000 by the late George Gill Mounsey, Esq., of Castletown, Carlisle. It is built on the site of the old hotel, which was burnt to the ground on the 27th Aug., 1859. The hotel is surrounded by beautiful flower-gardens and shrubberies, and will accommodate 200 visitors.

The path down to the Spa leads directly from the outer gate of the hotel grounds ; for the first fifty yards it is arched by the interlacing branches of trees, and the rest of the way is bounded on the left by lofty rocks, and on the right by the swift-flowing Irthing. Bath-rooms and refreshment-rooms occupy the river side. At the end of this walk, and at the very base of the precipice, towering 90 feet overhead, the medicinal waters, sparkling with sulphuretted gas, are pouring through a pipe into a small basin at the rate of two-and-a-half gallons per minute. After drinking of the water, we crossed the wood bridge over the Irthing, and pursued the upward course, and soon we once more gained the river side. Here the imposing geological conformation of the opposite rocks is seen to fine effect. Now we cross the Irthing on stepping-stones, and still going upward, we walk along a pretty and favourite promenade, which conducts to the Popping Stone and Kissing Bush of Sir Walter Scott. Next we pass the green grove cottages, and turn into the wood on the left, and there see the ferruginous, or chalybeate spring, trickling from the rock.

From the brow of the abrupt precipice overlooking the Sulphur Spa the Irthing can be traced for miles, encompassed by rough crags, dashing over its rude bed ; a mile and a half further up it tumbles over some lofty rocks, forming a waterfall of great beauty. In this country of charming streams there is not one more lovely than the Irthing.

We then wended our way back, and in coming up to the Shaw's Hotel took a beautiful specimen of *Eurymene Dolobraria*. After refreshing ourselves we retraced our steps to the station, the day being one of the most enjoyable I ever spent.

On Tuesday morning I started from Brampton to Carlisle, and had a few hours to spend there before I could get a train for Bradford, so I went to the Cathedral and round the Castle, then on to Stanwin, a pretty little village through which the river Eden flows. At 1-10 I left Carlisle by the Midland, in a Pullman car, and reached Bradford at 4-15, well satisfied with my excursion.

Short Notes and Queries.

THE RAINFALL IN SEPTEMBER.—Huddersfield.—During September my gauge registered 4·73 inches in 25 days, making the total fall for the nine months 23·14 inches. The average is thus again made up, 22·98 inches, being the mean of 1866-75. The average rainfall of September is 3·48 inches, and the number of rainy days 17. The heaviest fall (0·70 in.) occurred on the 8th. The wind has been more than usually variable throughout the month.—J. W. ROBSON.

Dalton, 2nd October.

THE RAINFALL IN SEPTEMBER.—Wakefield.—Rain fell on 24 days, the collective quantity amounting to 3·13 inches. The greatest daily fall occurred on the 30th, to the depth of 0·62 inches. There has been a marked decrease in temperature in this month, and north-westerly winds have been most prevalent.—FREDK. HILL.

Wakefield, 12th October.

THE NESTING SEASON AROUND HALIFAX.—Though cold inclement weather in the early spring caused many of the migratory birds to reach our valleys at later dates than usual, nevertheless, when they did arrive many species proved more numerous than in past summers. Alluding first to those birds which resort to the high moorlands in preference to the more sheltered dales, the dunlin has during the summer been abundant on Wadsworth and Midgley moors. The golden plover (one of our rarer birds), the common snipe, ring ouzel, and mountain linnet, have, as usual, nested on the moors, the two latter kinds being numerous. The wheatear, our first herald of spring, is annually on the increase. Nightjars have appeared more abundant than in former summers. Of those kinds which generally repair to the valleys in the spring time for incubation, mention may be made of the following :—Rays' wagtail, chiffchaff, garden and grasshopper warblers, black-headed bunting, redpole, ring dove, stock dove, landrail, moor hen, common sandpiper, water-ouzel, and kingfisher. All these, together with many other migratory and indigenous varieties, have bred in this part of Yorkshire during the present year.—F. G. S. RAWSON, Thorpe, Halifax.

CUCKOO'S EGG.—In the beginning of last July, as I was taking a walk on a heathy waste near this village, my attention was attracted towards a skylark which I saw hovering a few feet above the ground, and then drop suddenly down. As I felt confident by its movements that there was either a nest or fledged young, I went to the place, and found it had a nest (containing four eggs) built in a tuft of bent grass ; but, to my surprise, I found that one of the eggs differed from the rest in being inferior in size, a little more broadly ovate, and the ground colour of a reddish grey,—characters which convinced me that it was the egg of a cuckoo, I never before found its egg in the nest of any bird with the exception of the titlark and the whinchat. I once found two in the nest of a

titlark. In this locality, and I believe in all the northern counties of England, it usually selects the nest of the titlark in which to deposit its eggs. It never, so far as I am acquainted with its habits, lays in the nest of the hedge chanter.—E. P. P. BUTTERFIELD, Wilsden.—[We have found the egg of the cuckoo in a song thrush's nest.—EDS. NAT.]

Sphinx convolvuli AT BRIGHTON.—I send you a large moth I found a day or two ago at Brighton.—ALEC MALLINSON, Leeds, Sep. 20th, 1876. [The specimen is a fine example of *Sphinx convolvuli*.—EDS. NAT.]

ABOUT three weeks ago, when fishing the Nidd above Pateley Bridge, I came upon a fine patch of *Impatiens noli-me-tangere*.—J. S. WESLEY.

Wetherby, 13th October.

Reports of Societies.

BRADFORD NATURALISTS' SOCIETY.—Meeting Oct. 3rd, Mr. J. Firth, vice-president, in the chair.—Amongst the specimens were a number of ferns exhibited by Mr. J. W. W. Brook, including *Polystichum aculeatum*, *P. angulare*, *Asplenium viride*, *A. Trichomanes*, *A. Ruta-muraria*, *Poly-podium Dryopteris*, *Scolopendrium vulgare*, and a beautiful specimen of *Adiantum capillus-veneris*, the last specimen was raised from the spores: a fungus, *Amanita muscaria* was exhibited by Mr. B. Illingworth, and a merlin hawk by Mr. R. Spencer. Mr. Bamford read a paper on the subject of "Natural Selection;" a lively discussion followed which lasted the remainder of the evening; it was arranged that the subject be further discussed at the next meeting.—J. W. W. BROOK, Hon. Sec.

GOOLE SCIENTIFIC SOCIETY.—The first evening meeting of the present season was held on Wednesday, Oct. 18th, at the Board Schools, Goole. The president, Mr. Hunter, was appointed delegate to represent the Society on the managing committee of the W. R. Consolidated Society. A summary of the conchological observations made during the past summer was given by the Rev. R. W. Maxwell, and illustrated by a large series of specimens. As many as forty-five species had been observed in the neighbourhood of Goole, including *Unio pictorum* and *tumidus*, *Driessena polymorpha*, *Tellina tenuis* (among the debris on the river bank, probably brought up by the tide), *Cyclas rivicola* and *ovalis*, *Pisidium amnicum*, *Neritina fluviatilis*, *Paludina Listeri* and *vivipara*, *Helix cantiana*, *Limnaeus palustris*, *stagnalis* and *auricularius*, *Planorbis corneus*, *contortus* and *carinatus*, *Succinea putris*, *Physa fontinalis* and *hypnorum*, *Ancylus fluviatilis*, &c. A small series of land shells from Bradley Knoll, Somerset, was exhibited by Dr. Parsons, including *Cyclostoma elegans*, *Clausilia laminata* and *Bulimus obscurus* and *montanus*. A number of marine shells collected by Mr. Rockett, at Paignton, South Devon, were on the table. Among them were *Tapes*

pullastra, *Tellina tenuis*, *Donax anatinus*, *Solen ensis*, *Cardium rusticum*, *Anomia ephippium*, *Patella pellucida*, *Pileopsis Hungaricus*, *Natica monilifera*, *Nassa reticulata* and *incrassata*, and *Cypræa europea*. Mr. Birks read a paper, giving a resumé, of the botanical observations of the season, and handed in a carefully compiled list of plants, 500 in number, observed in the neighbourhood of Goole, or on the Society's excursions. Among the more remarkable discoveries made during the past season in the neighbourhood of Goole, may be mentioned—*Erysimum cheiranthoides*, *Silene noctiflora*, *Inula Helenium*, *Gentiana Pneumonanthe*, *Anchusa sempervirens*, *Utricularia minor*, *Habenaria bifolia*, *Carex limosa* and *Botrychium lunaria*. A number of recent and dried plants were exhibited, including a series of fungi, of which interesting order a brief description was given by Dr. Parsons. Among the specimens shown were *Agaricus grammopodius*, *A. melaleucus*, *A. filopes*, *A. velutipes*, *A. galericulatus* and *A. squarrosum*, *Hygrophorus coccineus*, *H. conicus* and *H. virginens*, *Lactarius quietus*, *Boletus erythropus*, (?) *Stereum hirsutum* and *S. spadiceum*, *Didymium cinereum*, *Trichia chrysosperma* and *T. serpula*, *Bulgaria sarcoides*, *Hypoxylon concentricum*, *Xylaria hypoxylon* and *Nectria cinnabarina*, the latter bearing both conidia and perithecia, and forming a beautiful microscopic object under a low power.—

H. FRANKLIN PARSONS.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting September 18th, the president, Mr. G. T. Porritt, F.L.S., in the chair.—In geology Mr. Joseph Tindall exhibited a very fine specimen of *Sigillaria reniformis*, from Liversedge ; and Mr. Henry M'Kenzie the following from Scarborough and neighbourhood :—*Belemnites incrassata*, *Gryphœa incierra*, *Ammonites communis*, *Omphalodes*, *Encrinite*. Botanical specimens were laid upon the table by Mr. James Varley (from Doncaster), Mr. M'Kenzie (from Scarborough), and Mr. Joseph Tindall (local), the last included *Reseda luteola*, *Crocus autumnalis* (from near Birkby), *Erodium cicutarium*, *Ononis arvensis*, *Sium angustifolium*, *Bidens tripartita*, *Linaria purpurea*, *Gentiana campestris*, and many others. Mr. C. P. Hobkirk recorded his observations on the winter buds of *Hydrocharis morsus-ranae*, deposited at the bottom of a pond in his fernery. In entomology the president showed a fine preserved larva of *Stauropus fagi*, one of several collected in a wood at Thetford, by Lord Walsingham, during the present season ; also living larvæ of *Herminia tarsipennalis*, reared from eggs sent by the Rev. E. N. Bloomfield, M.A., of Hastings. Mr. James Varley exhibited *Luperina cespitis*, from Doncaster ; also the example of *Zeuzera cæsuli* taken at Almondbury Bank, and new to the district. Mr. S. L. Mosley mentioned as a singular coincidence that he had been greatly surprised to find an empty pupa case of the species at Woodsome about the same date. A member had also taken a full-grown larvæ of *Acronycta aceris* at Cremorne, which also was a species new to the district. The president recorded the large abundance of hedgehogs taken in the district this year,

he had heard of a great many. Several geological papers, presented to the library by Mr. Wm. Whittaker, F.G.S., of Ipswich, were laid upon the table. The first of two lectures on "The Optical Principles of the Microscope" was delivered by the secretary (Mr. George Brook), and was listened to with the greatest interest.

MEETING September 30th, the president in the chair.—The geological specimens exhibited included *Sphenopteris affinis* from Barden Tower, by Mr. Henry M'Kenzie ; and the following from Caithness, Nairn, and Tynet, by Mr. John Conacher :—*Ammonite* and *Gryphaea incurva* from the liassic, *Producta* and *Inoceramus* from the carboniferous, *Osteolepis*, *Pterichthys*, and *Glyphos* from the old red sandstone formations. In botany Mr. M'Kenzie shewed *Hypericum humifusum*, *Asplenium Adiantum-nigrum*, *Medicago lupulina*, *Potamogeton crispus*, &c., from Barden Towers. In entomology the president showed specimens of the very rare *Diasemia literalis*, taken by Mr. C. G. Barrett in East Pembrokeshire last June ; also *Ebulea stachydalis*, sent to him by Mr. Barrett, who discovered the species as British, near Pembroke, last year. Mr. S. L. Mosley exhibited preserved larvæ of *Acronycta tridens* and *Bombyx rubi* ; Mr. J. B. Littlewood, a locust taken in a lady's dress in Spring Grove Street, three days previously ; this was the second example taken in the town during this summer. A larva of *Acherontia Atropos* was reported as having been taken in the district by Mr. Henry Stephenson. The secretary (Mr. George Brook) shewed a very finely preserved arrow head of the neolithic age, found a few days previously on Satron Moor, Swaledale ; in connection with the find Mr. Brook gave an interesting historical account of that neighbourhood. Mr. George Brook afterwards delivered his second lecture on "The Optical Principles of the Microscope," illustrating it with figures and specimens of the different apparatus used, &c. It was decided that the society recommend Nostel Priory, near Wakefield, as one of the excursions of the West-Riding Consolidated Naturalists' Society next season.

MEETING October 16th, Mr. Joseph Tindall, vice-president in the chair.—Mr. J. R. Dore presented to the society a photograph of the Yorkshire naturalists, taken on the occasion of the excursion to Boroughbridge, August 7th. Mr. Richard Jessop made some remarks on the specific differences of *Gentiana Amarella* and *G. campestris*. Mr. John Conacher, Jun., exhibited specimens of *Unio margaritifera*. The chairman said the species was formerly common in this district ; this, however, was denied by the conchologists present. Mr. S. L. Mosley showed a range of specimens of *Lycæna ægon*, from Zermatt, Aigle, and England ; those from Zermatt were very much smaller, and those from Aigle very much larger than the British. The proceedings of the Hull Natural History Society were laid on the table. Mr. Lister Peace showed a very interesting slide of teeth of *Helix lamellata*, prepared by Mr. John Turner, of Stockport. Mr. William Nettleton read a paper on the "British Mammalia."—G. B.

LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—226th Meeting, Sept. 26th, Mr. Fred. Coates, V.P., and Mr. James Abbott, V.P., successively, in the chair. Donations to the local museum were announced, and votes of thanks passed. Mr. Benjamin Holgate read a paper on "Limestone Formations," illustrated by geological maps and numerous specimens. Some of these being microscopic, he was assisted by Messrs. James Abbott, S. S. Peat, Godfrey Carter, and Samuel Jefferson, F.C.S., and the Society lending microscopes. There was a good discussion, after which Mr. Charles Smethurst showed *Noctua sobrina* from Scotland, and a number of plants from Shoeburyness, which were named by Mr. F. Arnold Lees, F.L.S.

227TH MEETING, October 3rd, Samuel Jefferson, F.C.S., president, in the chair.—Donations to the library and local museum were announced, and thanks voted. Mr. John W. Taylor showed *Helix Bednalli*, which had survived a voyage from South Australia; *Helix arbustorum*, from the summit of the Gemmi pass, Switzerland, and from the valley below, showing the remarkable effects of altitude, the specimens from the mountains being much dwarfed in size, and more elongate in form; and *Helix ericetorum* from the shores of Lake Uri, very much dwarfed, though other species found in the same spot are of normal dimensions. Mr. William Nelson exhibited *Planorbis vermicularis* from Oregon, and *P. glaber*, and showed that the two shells are identical; *Limnaea truncatula*, showing its great range of variation; and several allied species from Cuba, California, &c.; Mr. Scholefield brought a large American moth, and Mr. Henry Pollard some unidentified fossil shells from Whitby; Mr. John Grassham showed a case of birds, including the fork-tailed petrel, the puffin, and the little gull. Mr. Charles Smethurst, in addition to twenty-three species of local lepidoptera presented to the Club's collection, showed *Pachnobia alpina* and other rare moths. A number of the locusts which have occurred in Yorkshire were shown. The secretary showed two specimens from Huddersfield, one taken at Armley, near Leeds, was shown by Mr. Crowther, and one from Wakefield was exhibited by Mr. Wm. Talbot, of that town, who was present as a visitor.

228TH MEETING, Oct. 10th, the president in the chair.—Donations to the library were announced, and thanks voted. Mr. Thomas Hick, B.A., B.Sc., delivered a lecture on "Mushrooms." He commenced his subject by pointing out the error of supposing that activity of life in the vegetable kingdom was confined to one season. As a fact, there was not one period of the year when there was not some form of active vegetable life existing. Just now, when the giants of the vegetable world were retiring to rest, the mosses, fungi, and lichens presented themselves more directly to our notice, and were now in a better state for study than at any other time of the year. Having spoken of the distribution of fungi, he

went into the structure and physiology, and closed the lecture with a distinctive account of edible and poisonous fungi, a number of specimens being exhibited in illustration of this part of the subject. A discussion was afterwards joined in by several of the members present.

229TH MEETING, October 17th, Mr. William Nelson, curator, in the chair.—Mr. James Irwin Coates, F.R.A.S., showed a monstrosity of the common daisy from near Monk Fryston, two flowers and their stalks having coalesced. Mr. John W. Taylor showed specimens of *Helix hortensis*, *H. nemoralis*, *H. sylvatica*, and *H. austriaca*, from Switzerland. The whole of these four species were proposed to be united into one by the eminent French conchologist Deshayes, but now they are generally considered distinct. The specimens of *H. hortensis* were remarkable for being more richly tinted than ordinarily, and for the noticeable regularity in the banding of some of the specimens. Mr. Wm. Nelson showed *Zonites radiatulus* from Thorner, new to the Leeds district; *Ancylus fluviatilis*, var. *gibbosus*, a local variety from Thorner, near Leeds; and *Helix rotundata*, var. *alba*, from Seacroft, near Leeds, a rare, though widely-distributed variety. Mr. S. Schofield showed some coins, and Mr. C. H. Bothamley six specimens to illustrate the different forms assumed by the common mineral quartz, from the lead mines of the Yorkshire and Westmoreland dales. A letter from Mr. F. G. S. Rawson was read, recording the capture of otters near Halifax, and of various birds in the same locality in August and September.—W.D.R.

LEEDS GEOLOGICAL ASSOCIATION.—At the opening of the third session of this Association on Tuesday evening, September 26th, Mr. W. Cash, F.G.S., of Halifax, gave an address on "Ammonites and their Allies." Mr. W. Cheetham presided. Mr. Cash pointed out the distinguishing features of the two great orders of the class *Cephalopoda*, *Tetrabranchiata*, and *Dibranchiata*, to the former of which the family *Ammonitidae* belong. He then described in detail the structure of an ammonite, and compared it with the existing species of nautilus and octopus, showing the points of difference and resemblance in each. The lecturer stated that the nautilus was a very persistent form of life occurring in the Paleozoic formations, and extending through the secondary and tertiary periods down to the present time; while the true ammonite was confined to the secondary period. The lecture was illustrated by a number of diagrams and specimens of fossil and recent forms of *Cephalopoda*.

MIRFIELD NATURALISTS' SOCIETY.—The second annual meeting of this Society was held on Saturday, the 30th ult., in the Working Men's Club Room, Snakehill, when the following persons were re-elected:—Rev. Benjamin Wilson, president; Mr. Simeon Kaye, vice-president; Mr. Edwin Stoks, secretary; and Mr. James Buckley, treasurer. Mr. Wm. Buckley was elected librarian in the place of Mr. Joshua Buckley. The secretary's report showed a total of 36 members in the Society, 9 of whom

joined during the past year. Twelve meetings had been held. The library consisted of 33 volumes, and the books had been well circulated. The favourite study was botany, and considerable interest had been shown in that subject. Ornithology, lepidoptera, and geology had not been quite forgotten, and there were hopes of these branches being better represented in future. Members of the Society had attended all the rambles of the West Riding Consolidated Naturalists' Society, and, no doubt, a better knowledge of the surrounding country had been obtained. The income and expenditure showed a balance of £2 10s. 5d. in the hands of the treasurer. Votes of thanks were given to the officers, and to Mr. Luke Holt for auditing the books.—E. STOKS, Hon. Sec.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting, Illingworth, on Saturday evening. In the absence of the vice-presidents, Mr. James Spencer, of Halifax, presided, and made some excellent introductory remarks, after which the following geological specimens were exhibited, from the new railway cutting, Queensbury, by Messrs. Cockcroft and Crowther, including Pecten, *Sigillaria organum*, *Dadoxylon*, *Lepidodendron*. Mr. James Binns presented to the society a beautiful microscopic section of *Sigillaria vascularia*; Mr. Hirst exhibited and named a number of birds—a group of ruffs, male and female, in a case; Chinese golden pheasant, two short-eared owls, pair of terns, and also a good number of foreign birds.—J. OGDEN, Sec.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly meeting Oct. 8th, Mr. A. Dickson, vice-president, in the chair. Mr. Campbell described what great differences sometimes occurred in the structures of rock masses when intercepted by throws, &c. *Erratum.*—It was stated that at the September meeting Mr. Lumb exhibited the grey bunting's egg; it ought to have been the common bunting.—J. SPURLING, Hon. Sec.

WEST RIDING CONSOLIDATED NATURALISTS' SOCIETY.—On October 7th, this Society closed the 15th annual season with a meeting, which was held in the Church School-room, Battyeford, near Mirfield. Of the twenty-one Societies which form the union, only two, Rippenden and Paddock, were entirely unrepresented. The chair was occupied, in the absence of the president, by the Rev. Wm. Fowler, M.A., vicar of Liversedge, V.P. The minutes were read and passed. The secretary, Mr. J. M. Barber, of Heckmondwike, presented the annual balance sheet, which was audited and approved. A resolution of much importance, inasmuch as it altered the mode of government of the Society, was proposed by the chairman, seconded by Mr. C. P. Hobkirk, of Huddersfield, and carried by a large majority. The resolution provided that in future the union shall be governed by a council, to consist of a president, four vice-presidents, and two secretaries, in addition to delegates appointed by the local societies in proportion to their numbers, at the rate of one delegate for every fifty members. The officers were then chosen for 1877, the

Rev. William Fowler, M.A., being elected president, and Messrs. J. M. Barber (the retiring secretary), Thomas Lister, of Barnsley, H. Franklin Parsons, M.D., of Goole, and Joseph Wainwright, F.L.S., of Wakefield (the retiring president), the four vice-presidents. Messrs. G. Brook, secretary of the Huddersfield Naturalists' Society, and William Denison Roebuck, secretary of the Leeds Naturalists' Club and Scientific Association, were appointed joint-secretaries. A vote of thanks to the retiring officers was passed, special mention of the long and unwearied labours of the retiring secretary, Mr. J. M. Barber, being made by Mr. S. D. Bairstow, of Huddersfield. A vote of thanks was passed to the Rev. B. Wilson, of Mirfield, for the use of the school-room, and to the ladies who had in large numbers assembled to cater for the wants of the excursionists by presiding at the tea tables. The places for excursions for next season were then decided on, viz:—Wetherby, for the Cowthorpe Oak (Easter Monday); Nostel Priory (June); Shipley Glen; Norland Moor; Goole, for Thorne Waste; Sherburn, for Bishop Wood; and Wakefield, for the annual meeting in October. Afterwards the various specimens gathered during the afternoon were named by Dr. Parsons, Mr. Joseph Tindall, of Huddersfield; Mr. George T. Porritt, F.L.S., of Huddersfield; Mr. Thos. Lister, and Mr. C. Hanson, of Stainland. The rarer plants were—*Prunus cerasus*, *Glyceria aquatica*, *Salix cinerea*, *Artemisia vulgaris*, *Chenopodium album*, *Epipactis latifolia* (Hopton), *Sonchus asper*, *Angelica sylvestris*, *Viburnum opulus*: *Fungi*—*Coprinus micaceus*, *Polyporus betulinus*, *Lycooperdon pyriforme*, *Hygrophorus psittacinus*, *Dacrymyces stellatus*, *Xylaria hypoxylon*, *Nectria cinnabarina*, *Scleroderma vulgare*, *Agaricus radicatus*, *A. fascicularis*, *A. atro-albus*, *A. melleus*, *A. campestris*, *A. sericeus*, *A. semi-globatus*, *A. separatus*: *Fossils*—*Calamites approximatus*, *Lepidodendron Harcourtii*.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting, Wednesday, Oct. 11th, Mr. William Chapman in the chair.—Mr. C. D. Wolstenholme exhibited a very fine specimen of the turnstone (*Strepsilas collaris*), lately shot at Harrogate, and gave a very interesting account of the structure and habits of the bird; Mr. Gillah: eggs of the snowy owl (*Strix nyctea*) and common buzzard (*Falco butea*). Mr. Simmons: fine series of the following insects—*Phlogophora empyrea*, *Aplecta tineta*, *Noctua ditrapezium*, and *Selenia illustraria*. Mr. Robinson: *Boarmia abietaria*, *Boarmia roboraria*, and *Polia flavicincta*. Mr. Helstrip: the black-bellied darter (*Ploutus melanogaster*), and the summer duck (*Q. sponsa*), shot by Mr. J. F. Walker, Claxton Hall, in the United States of America. Mr. Humphries: neck and handle of large Roman amphora; also fragment of figured Samian ware found during excavations in the city. The secretary (Mr. Prest): fine series of *Platypteryx hamula*, *Boarmia abietaria*, *Macaria alternata*, bred; *Dianthæcia coesia*, *Acidalia contiguaria*, *Eupæcilia implicitana*, *Phloxopteryx comptana*, &c.—WM. PREST, Hon. Sec.

Diary.—Meetings of Societies.

- Nov. 1. Entomological Society of London, 7 p.m.
,, 2. Linnean Society of London, 8 p.m. South London
Entomological Society, 8 p.m.
,, 4. Mirfield Naturalists.
,, 7. Leeds Naturalists' Club and Scientific Association.
Bishop Auckland Naturalists.
,, 8. York and District Naturalists.
,, 11. Heckmondwike.
,, 13. Huddersfield Naturalists'—Paper: "An Entomological
Visit to Howth."—The Rev. G.C.B. Madden, B.A.
,, 14. Leeds Naturalists' Field Club and Scientific Association
—Paper: "The Reasoning Powers of Cater-
pillars."—S. Everard Woods. Bradford.
,, 16. Linnean Society of London. South London Entomo-
logical Society.
,, 21. Leeds Naturalists' Field Club and Scientific Association.
,, 23. North Staffordshire Naturalists' Field Club, at Hanley.
,, 25. Huddersfield Naturalists'—Paper on "Shells."—Mr.
Wm. Clegg. Ovenden.
,, 28. Leeds Naturalists' Field Club and Scientific Association
—Paper: "Prehistoric Man—Geologically, Eth-
nologically, and Archaeologically Considered."—
Peter Gilston. Bradford.
,, 30. South London Entomological Society.

BOOKS RECEIVED: "Quarterly Journal of Conchology," Vol. I., No. 9 (May and August, 1876). "Science Gossip," October, 1876. Leeds Naturalists' Club and Scientific Association: Sixth Annual Report, 1875-6.

EXCHANGE.

DUPLICATES—*Elusa*, *Hyale*, *H. Comma*, *T. Quercus*, *Argiolus*, *Egon*, *Progemmaaria*, *Amataria*, *Piniaria*, *Graminis*, *Diffinis*, *Puta*, *C. Nigrum*, *Nupta*, *Empyrea*, all in first-rate condition.

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Original Articles.

THE BRITISH PYRALES.*

By G. T. PORRITT, F.L.S.

I HAVE thought it advisable to give a short paper on the British representatives of the order of moths known as the Pyrales, as I fear the group is perhaps a little neglected by the generality of lepidopterists of this Society. Not that I have much to advance that is new—indeed the first thing that strikes me on commencing to write is how very little I really know, and still less from personal observation, about the order myself, for notwithstanding that I have professed to take the group in hand, more particularly during this and last season, I feel that I have made but little progress beyond getting a tolerable show of specimens in my cabinet.

To come more directly to the subject, the Pyrales form the ninth order of British lepidopterous insects. According to the late Mr. Doubleday's catalogue it is comprised of twenty-seven genera, containing in all seventy-six British species. Taking them altogether they are a rather showy lot of insects, indeed many of them are very pretty ; whilst in the most soberly-attired species the arrangement of colours is for the most part very neat. The fact before alluded to, therefore, that comparatively little attention is given to them by macro-lepidopterists generally is somewhat remarkable. I think it is to be accounted for, to some extent, from the circumstance that the order comes nearly at the end of the macro lepidoptera, and the species being for the most part rather small, by the time the collector has pretty well worked the earlier orders, and reached the Pyrales, he begins to think about studying the micro-lepidoptera, and these soon become so fascinating, that the Pyrales and the Crambites (the following order) are skipped over. Moreover, they are rather unsatisfactory in other respects, many of them being exceedingly difficult to breed, as the larvæ are rarely found, and the female moths baffle all means tried to induce them to deposit their eggs. As a consequence the larvæ, and even the food of many, including some of the commonest species, are absolutely unknown. However, be the reason what it may, the fact remains that, except amongst the Crambites, less is known of the life-history of the Pyrales than of any other family of the lepidoptera.

N. S., VOL. II.—DEC., 1876.

* Prepared for Huddersfield Naturalists' Society's Meeting, Oct. 28th, 1876.

Our own district is not rich in the group—indeed it is decidedly poor, as in all, only some twenty-six species (in thirteen genera) have ever been taken here; and at least half-a-dozen of these are now rare—some of them, so far as I can discover, completely gone, as they are no longer to be taken in their old localities, and new ones have not been forthcoming.

The species are exceedingly variable in their habits, both in the larval and perfect stages; but rather than make any general observations on their peculiarities here, it will perhaps be better to allude to them as we come to treat of the different genera and species in order.

The genus at the head of the list, the *Odontidæ*, contains but a single British representative, namely *dentalis*. It is a very pretty and striking species, especially when alive; a single glance at its singular but neat tooth-like marking will at once give the clue to the derivation of its name. I have never taken it on the wing, but have had a good many specimens, having on several occasions had a good supply of both larvæ and pupæ sent to me, chiefly from St. Leonard's-on-Sea, where it is very plentiful. The larva is found on the viper's bugloss, *Echium vulgare*; it feeds beneath the large leaves at the bottom of the plant, eating the leaves and central flower stem, often in clusters of five or six. My old correspondent, the Rev. E. N. Bloomfield, M.A., of Guestling Rectory, near Hastings, believed the larva was a gall maker. In a letter I have from him, dated February 27th, 1872, he says:—"I feel sure I am right about *dentalis*, although as yet I have seen no young larvæ, but I will look this spring. My reasons for thinking I am right are these: the larva is almost invariably found in a swollen but stunted shoot, and there is no mark of the place at which the larva entered, at least I have not observed any. Its history would seem to be this: the young larva enters the shoot in spring, or early summer, this shoot does not increase except very slightly in length, but swells out into a gall, the larva feeding on the interior; when it is full fed, or nearly so, the shoot dies and the larva turns to a pupa in the cavity. Thus far seems almost certain, but there are doubtless other interesting points about the formation of the gall, and I must try to elucidate some of them next summer." Whether Mr. Bloomfield ever continued his investigations in this interesting subject I do not know, but it certainly ought to be thoroughly ascertained whether the larva of *dentalis* is really a gall maker, as, if so, it is probably the only one amongst the macro-lepidoptera.

The next family, the *Pyralidæ*, contains two genera, viz., *Pyralis* and *Aglossa*. The former is composed of the three species, *fimbrialis*, *farinalis*, and *glaucinalis*, all pretty common, although only one (and that the most abundant of all), *farinalis*, or meal moth, occurs in this neighbourhood ; of the others, although generally distributed, I am sorry to say I know but little of their early histories ; the larva of *glaucinalis* feeds in nest-like formations at the end of birch twigs in spring, and the moth is a not uncommon visitor at sugared trees in summer. Part of my specimens were sent to me some years ago, by Mr. Jackson, of York. Of the habits of *fimbrialis* I know nothing. *Farinalis* is a plentiful and well-known insect ; who has not noticed and admired the beautiful bright purple-and-yellow little moth, so often found sitting with its peculiar "cocked-up tail" (which habit by-the-way is characteristic of many families in the order) on the door, roof, or window of almost any stable they happen to enter in summer ? It is a species, however, which farmers will do well to keep down as much as possible, as, though pretty, it is a wicked creature, delighting to deposit its eggs in the corn, meal, &c, in the stable bins, in which situation the larvæ, if unchecked would doubtless soon become very troublesome. The other genus, *Aglossa*, contains two species, *pinguinalis* and *cuprealis*, both of which are recorded as occurring in this district. The former is common enough, but I should very much like to see an example of *cuprealis* which has been taken here. These are also very much attached to stables, outhouses, &c., although *pinguinalis* at any rate is often taken in lanes and gardens at a considerable distance from them. Its larva feeds (as probably does that of *cuprealis* also) on old greasy horse-cloths and other rubbish in spring ; the imagos are on the wing in June and July. Of *cuprealis* I can say but little ; it seems to be scarce, as I never hear of anyone taking it, and indeed I do not know where it is to be got, although as it is by no means rare in cabinets, some one must come across it occasionally. Two of my specimens were sent to me by Mr. Joseph Sidebotham, of Manchester.

The next family, the *Cledeobidæ*, contains but one genus, and only the single species *Cledeobia angustalis*. Its larva is said to feed in moss, on the coast, in May, and the moth is on the wing in June or July. I have never seen it alive, though it is not uncommon in some of the southern counties.

The next family has four genera—*Pyrausta* with three species, *Rhodaria* with one, *Herbula* with one, and *Ennychia* with three. They are true day insects, delighting in the hottest sun, and amongst them

are some of the most strikingly-marked moths in the whole order of the Pyrales. They are found in various situations, some being partial to the clearings, or open spaces in woods, others frequent downs and sea-cliffs, whilst one occurs only on sandhills. To notice them more particularly, the three species in the first genus, viz., *Pyrausta punicealis*, *purpuralis*, and *ostrialis*, together with *Herbula cespitalis* and *Ennychia cingulalis* and *auguinalis* all delight in sandy or chalky slopes or downs, as well as clearings and open places in woods. They skip about with great rapidity, and are rather difficult to see in the blazing sun, and consequently not always easy to get hold of. As several different species, too, often fly together, it requires a little patience if you only happen to want one particular kind. I have taken several of them in the woods of Kent and Sussex, and on the Sussex downs and cliffs. It may be as well to say here, too, that although *purpuralis* and *osirinalis* are generally placed as distinct species, I have very great doubt about it myself. Of their larvae that of *cingulalis* is said to feed on *Salvia pratensis*; it commences in summer but hibernates, and is not full-grown until April following; *punicealis* in June, July, and August, in flower-heads of *Nepeta cataria*; *purpuralis*, and *ostrialis*, in June and July, between the leaves of *Mentha arvensis*; and *Herbula cespitalis* under leaves of *Salvia pratensis* and *Plantago* in June. The lovely little *Rhodaria sanguinalis* is only found on sandhills near the sea, Wallasey, in Cheshire, being perhaps its best locality; I believe it is on the wing in June and again in August, and its larva is found in July on thyme flowers. The remaining species in the family, *Ennychia octomaculalis*, is perhaps the best known of all, and is always a great favourite; it is the largest species, and its intensely black ground with eight equally white spots make it a beautiful and conspicuous object, either on the wing or when pinned in the cabinet. It is a generally-distributed species, for, although more plentiful in the north of England, I have found it commonly in the Sussex woods; it is abundant in Wales, and equally so in the Lake district, occurring in every part of it in which I have collected; I once took one or two even on the mountain sides near Witherslack. It is out a long time from early summer onwards. Unfortunately nothing whatever seems to be known of its early history, consequently I should be very glad if some member of our Society would endeavour to work it out. One I know has taken a fair number of specimens during the past summer. Five species of the family are recorded from this neighbourhood, but I fear some of them are gone, *Ennychia octomaculalis* at any rate, for I have not heard of a specimen for years.

The next family, the *Asopidae*, is composed of two genera, *Agrotera* and *Endotricha*, but they only contain a single species each. The first, *Agrotera nemoralis*, is a most beautiful and interesting one, and until two or three years ago was considered one of the rarest of the Pyrales, but few specimens having been taken, and all in the county of Sussex. My friend Mr. Tugwell, of Greenwich, however, was fortunate enough to turn it up in plenty in Abbotts' Wood, near Hailsham, three seasons ago, and since then it has been taken in large numbers in the same locality. Several months ago I had the pleasure of showing you specimens I took there myself in May last. Mr. Tugwell has very recently published so complete a history of this species that it is unnecessary to reproduce it here ; suffice it to say that the moth is very local, and entirely attached to hornbeam, on which its larva feeds. It flies at dusk in May, but is usually taken by beating the hornbeam bushes during the daytime, when it comes out with a short, quick, jerking flight. The larva changes to a pupa in July, and spends nearly ten months, including winter, in this stage. The species in the other genus, *Endotricha flammealis*, is a very much more generally distributed insect, though most abundant in the southern counties ; my own are from Sussex and Hampshire. I don't know anything of the caterpillar, but it is said to feed on heath in May, and the moth is out in June and July.

There are three genera, but only four species, in the next family in order : *Diasemia* with two, *literalis* and *ramburialis* ; *Nascia* with *cilialis* ; and *Stenia* with *punctalis*. *Literalis* and *ramburialis* are extremely rare, or rather the latter is so, and *literalis* was until last June, when Mr. C. G. Barrett, of Pembroke, took a fair number in a dry hilly field some sixteen miles from that town. Four of them he has very generously added to my collection, where they may now be seen. Mr. Barrett found them only on the dry desolate-looking hill-side, when disturbed they started out of the grass, and settled again a few paces further off : lower down in the field, where vegetation was more rank, not a specimen could be found. An example taken some years before by the Rev. J. Hellins, M.A., of Exeter—one of the few taken in Britain before this year,—was in or near a similar situation, so that is evidently the natural habitat of the species. I need scarcely say that as yet nothing whatever is known of its earlier stages. Of *ramburialis* I know nothing at all, indeed I don't remember to have ever even seen a specimen, though there are some odd ones in cabinets. *Nascia cilialis*, too, is a species of which but few examples have been secured, and those only at Wicken and Taxley Fens. That

in my collection was sent to me by Mr. F. D. Wheeler, of Norwich ; it is one of five taken by him at Wicken Fen in 1874. Perhaps this is the largest number of the species taken in one season by one entomologist on record ; I noticed, however, it was advertised for sale by one or two dealers last month, so probably a few have been taken this year. It flies in June and July, but nothing is known of its earlier stages. Of *Stenia punctalis* I know nothing personally, though it is abundant in many localities. It is out in August, and I fancy flies over marshy ground, but of this I am uncertain. My series came from Mr. G. P. Shearwood, who took them in the London district.

The family we next come to is the *Hydrocampidæ*, containing the four genera *Cataclysta*, *Paraponyx*, *Hydrocampa*, and *Acentropus*. It is a most remarkable family, as its larvæ have a trait in their character totally unlike those of most other lepidoptera, and which somehow seems altogether out of harmony with our preconceived notions of what caterpillar life should be ; it is none other than the fact that they are totally aquatic, feeding in cases formed on aquatic plants beneath the surface of the water. The life history of any one of them is intensely interesting, but as Mr. Buckler has so recently published so complete an account of several of them in the pages of the "Entomologist's Monthly Magazine," I must refer you to that journal for them. The four genera contain in all only five species, viz :—*Cataclysta leminalis*, *Paraponyx stratiotialis*, *Hydrocampa nymphæalis* and *stagnalis*, and *Acentropus niveus*. None of them are at all rare, though *stratiotialis* and *niveus* are somewhat local ; where any species does occur it is usually abundant. *Leminalis*, *nymphæalis*, and *stagnalis* occur in our own district—Sheard's reservoir at Kirkheaton I believe used to be a favourite locality. *Stratiotialis* is said to be found at Scarborough and Sheffield, in Yorkshire, and is common in the south ; whilst *niveus* swarms at Ringwood, in Hampshire, at Sheerness, and other places. *Niveus* is the most interesting of the group, and is one of the most peculiar of all the lepidoptera. Indeed I believe some entomologists still maintain that it is not lepidopterous at all, but should be placed amongst the *Trichoptera* ; and various papers in support of this view have been read before the Entomological Society of London and elsewhere. A masterly paper by Mr. M'Lachlan, was read before the Society just mentioned, several years ago, and the one by Mr. Corbin, published in the *Naturalist* last year clearly show, however, that it is rightly placed. All the species fly over and about water at dusk, from June to August. The larva of

lemnalis feeds on duckweed in April, *stratiotalis* on *Callitricha verna* and *Stratiotes aloides* in April and May ; and *nymphalis*, *stagnalis*, and *niveus* on *Potamageton*, the first two also in April and May, *niveus* in June and July.

Botydæ, the next family, is an extensive one, being formed of nine genera, and no less than thirty-one species. We will take them in order. The first—*Botys*—has ten, viz :—*lupulinalis*, *pandalis*, *flavalis*, *hyalinalis*, *verticalis*, *lancealis*, *fuscalis*, *terrealis*, *asinalis*, and *urticalis*. Only one of them is rare—*lupulinalis* ; several are local ; the others include the largest as well as some of the best known of the Pyrales. They are found amongst weeds at the foot of hedgerows, amongst underwood in woods, on railway embankments, &c., and in fine weather, being easily disturbed with the beating-stick, a good series may generally be easily obtained in the daytime, in places where they occur. These remarks will apply not only to this genus, but to the whole family, and is in fact the usual method of collecting them. Of the genus *Botys* only three species occur with us—*verticalis*, *fuscalis*, and *urticalis*, and of these *urticalis* only in any plenty, *fuscalis* is rarely taken, and Dungeon Wood is the only spot where I have ever seen *verticalis* ; all three are abundant species in most places. *Lupulinalis*, as I said before, is very rare, but several specimens seem to have occurred in various parts of the Isle of Wight, and the last recorded example was taken by Mr. C. G. Barrett in the London district. Surely it ought to turn up more freely in the hop-fields of Kent ; but it is not a little odd that the recorded specimens are not from the hop-growing counties. *Pandalis* I took commonly at Abbotts' Wood, Sussex, at the beginning of June last, and it is not uncommon in woods in other southern counties. *Flavalis*, *hyalinalis*, *lancealis*, and *asinalis* are also most at home in the south ; *hyalinalis* I have got near Strood, Kent ; of *asinalis* I received a number of larvæ from Bristol (its best locality) in May last ; *fuscalis* I have taken in most districts I have worked at the time it is on the wing, both north and south. It is common in the Isle of Man. *Terrealis* is somewhat common near Grange, and its interesting larva I had the pleasure of describing in the "Entomological Monthly Magazine" in February last. The larvæ of all the species I have seen are semi-transparent creatures with prominent warts, and very lively. That of *lupulinalis* is said to feed in stems of hop in July, and probably hibernates ; those of *pandalis*, *flavalis*, and *hyalinalis* seem to be altogether unknown ; *verticalis* on the common nettles, between the leaves, in May ; *lancealis* on *Eupatorium cannabinum*, *Sium latifolium*,

ragwort, &c., from August to early in May following; *fuscalis* on the seeds of yellow rattle, also in August; *terrealis* on stunted (and apparently *not* on well-grown healthy plants) of golden rod from July to September; *asinalis* on the madder (*Rubia peregrina*) from July to May following. My friends tell me that the caterpillar of this local species is often so abundant in the neighbourhood of Bristol, that the conspicuous marks made in the madder plant by the larvæ, form quite a feature in the locality. *Urticalis* feeds on the common stinging nettle in September. The perfect insects of the genus fly at dusk, and all are on the wing sometime from the beginning of May to the end of July.

(To be continued.)

THE BIRDS OF WAKEFIELD:

With particulars of the occasional visits of Rare Species, and of those that have been observed to breed in the neighbourhood,

FROM 1845 TO THE PRESENT TIME.

BY WILLIAM TALBOT.

ANATIDÆ.—(Continued).

REDBREASTED MERGANSER (*Mergus serrator*)—

Is an occasional visitor in winter and spring. I have seen four which have been shot in the neighbourhood since 1860.

GOOSANDER (*Mergus Merganser*)—

One was shot at Stanley Ferry in January, 1860, a second was killed at Newmillerdam in February, 1865, and a third was shot at Kirkthorp in March of the same year.

COLYMBIDÆ.

GREAT CRESTED GREBE (*Podiceps cristatus*)—

Mr. H. Arnold shot one near the Low Mills, on the river Calder, in January, 1858. It occasionally visits Cold Hiendley and Nostell in spring.

REDNECKED GREBE (*Podiceps rubricollis*)—

One was shot at Newmillerdam in February, 1858, and one on the half moon fish pond, at Kirkthorp, in the same month, 1860.

SCLAVONIAN GREBE (*Podiceps cornutus*)—

For several years it has regularly visited Cold Hiendley and Nostell, in the months of February, March, and early part of

April. Mr. Ianson has several specimens in his collection, which were shot at the former place. I have one which was taken at Newmillerdam.

EARED GREBE (*Podiceps auritus*)—

One was shot on the Calder, at Thornes, in February, 1861, which subsequently came into my possession.

LITTLE GREBE (*Podiceps minor*)

Is found on several of the lakes and ponds in the district, and sometimes it breeds with us. On more than one occasion I have found its nest at Hickleton.

GREAT NORTHERN DIVER (*Colymbus glacialis*)—

One shot at Cold Hiendley reservoir, on the 6th December, 1875, by the gamekeeper.

REDTHROATED DIVER (*Colymbus septentrionalis*)—

This is a regular winter visitor at Cold Hiendley and Nostell. It has been shot at Kirkthorp and Horbury. Mr. Ianson has several fine specimens which he killed at Cold Hiendley.

ALCADÆ.

GUILLEMOT (*Uria troile*)—

Three were shot by Mr. Firth on the Calder, at Thornes, in the years of 1852-3.

PUFFIN (*Fratercula arctica*)—

One was found at Ardsley in 1871, which had been killed by flying against the telegraph wires. It was sent to Mr. Parkin to be preserved.

(*To be continued.*)

SCIENTIFIC NOMENCLATURE.

By S. D. BAIRSTOW.

In some of our rambles through the glorious old County of Yorkshire, I, as a member of the West Riding Consolidated Naturalists' Society, have constantly met with expressions, the substance of which is conveyed in the following few words :—" We want scientific nomenclature reforming." These opinions, coupled with my own ideas on the subject, have induced me to write the following, which, though it may not facilitate nor hasten such a reform, yet may do something in exposing a few anomalies and errors, in the study of Entomology more particularly. We live in a progressive age—" Forward " is our motto. Thus having regard to the disadvantages of a thing, the weak part or

parts of an undertaking, the deteriorating influence of strictures and drawbacks to worthy enterprise, one course only is open—Revision. Life is made up of steps, and each individual step ought to be an improvement on its predecessor. This is the great principle from which emanates the blessings and happiness, commercially and socially, of human life, and a principle which all should strive to cultivate. Our fathers speak of the good old times when they were young, and look upon the rising generation as ripe for perdition. But it is a notion as ridiculous as erroneous. Experience makes fools wise, and every man grows wiser as he increases in age, because he has the direct contact of others, with more youthful thought.

So much for an introduction : and now for its application. Luther was the grand reformer of religion, Linneus of science. Both were men superior to the age in which they lived, and both were founders of a distinct discipline in their respective theories. We, no doubt, have had a great foundation on which to work, and modern scientists have done their utmost to improve and mature the superstructure on such a basis. A few score years ago, in order to give a Latinised form of name to an insect, many of its peculiarities, habits, and sometimes a description of its form, were embodied in the name—until a naturalist so-called must have the Latin Grammar at his fingers' ends, and take a few lessons with the then Mr. Stokes on “Memory.” To a clever man undoubtedly this system was an acquisition, inasmuch as it acquainted him with an entire volume of matter on the meanest of God’s creatures ; but in those days, as now, they were not all clever men, and the balance, if anything, was on the side of ignorance, so that the disadvantages arising from such a prescription were as numerous as they were gigantic. When I went to college, our master used to say, “To the point. ‘Brevity is the soul of wit.’” And he was right. Much matter in little room is what we want in scientific nomenclature. A name should be put upon an insect for the express purpose of assisting memory, and not of distracting it : the simpler the name, the more powerful that assistance rendered to memory. Meanwhile a reform spread, and the long Latinised incongruities were shorn of their latitude, and nomenclature began to assume a more appropriate form. But even with this concession we must beware lest our subject is severed from its meaning, its head from the body. We have now, names with no bearing on the insect whatever, no connection, no sense. What we want is form, arrangement, and similarity of construction.

In confining myself to British butterflies, with the “Accented

List of the British Lepidoptera" as my guide, I will expose the subject more clearly to our minds. The generic name of an insect does (as it should) define to what family or branch that insect belongs. The specific in all cases should (but does not) specify some interesting trait, food plant, or habit, but more particularly the form of an insect. Instead of this, we classify them with Homeric, Platonic, mythological names without any relevance whatever to characters. We have forty-five butterflies deriving their names from mythological heroes, ancient towns, beauteous females, Herculean or noted males, remarkable graces, and one, *Selene*, being the Greek for *Luna*, the moon. We have all these mixed up into one great heterogeneous mass. Twelve names only are descriptive of the food plant, viz :—*Cratægi* (hawthorn), *Brassicæ* (cabbage), *Rapæ* (rape), *Napi* (turnip), *Cardamines* (bittercress), *Rhamni* (buckthorn), *Urticæ* (nettle), *Cardus* (thistle), *Rubi* (bramble), *Quercus* (oak), *Pruni* (blackthorn, *Prunus spinosa*), *Betulæ* (birch, *Betula alba*). Seven names explain a *specialité* in the colouring or habits of the insect, viz :—*C-album*, *Polychloros*, *W.-album*, *Dispar*, *Alveolus*, *Comma*, and *Livea*, whilst one only denotes the insect's locality—*Sylvanus* (found in woods), and one (*Sinapis*) is named from the common mustard, though the larva feeds on *Vicia cracca*, *Lotus*, &c. Out of the forty-five mythological names two are supposed to be typographical errors, viz., *Hyperanthus* (probably an error for *Hyperanthes*, a son of Darius, who fell at Thermophylæ), and *Agestis*, which most likely should be *agrestis*, a rustic. Two names, again, are neither one thing nor another, both amounting to about the same thing—*Davus* and *Pamphilus*, which were common names amongst the Romans.

Here, then, amongst sixty or seventy names only, we have a coat of many colours—inapplication, application, and part application,—and in thirty-five cases we can discern no individual treatment whatever. To touch on the moth race and speak of it in a like manner, would be to tax the patience of a Job, yet *en passant* may I say that I would much rather science paid a tribute of affection to modern benefactors like Haworth, Raschke, Stephens, and others, than to one of the daughters of Danaus (*Daplidice*), or to a beggar (*Mendica*). What do we want to know of Actaeon the hunter who saw Diana bathing, and was converted into a stag and killed? We know that our modest little skipper would not do such a thing, from sheer inability. Or what good do we derive from the knowledge of Elpenor, the friend of Ulysses, being changed by Circe into a hog? We know that our Elpenor, strong as he is, does not possess any piggish affinity.

In scientific nomenclature, I say, then, let us have a reform if possible. We want a rule with exceptions, and not all exceptions and no rule ; and the sooner scientific nomenclature is renovated by simplification and improved definition, the better it will be for the world in general, and science in particular.

Huddersfield, November, 1876.

Short Notes and Queries.

RAINFALL IN OCTOBER.—Huddersfield.—Notwithstanding an unusually heavy fall on the 8th (1·42 in.), the rain during this month has been under the average, the register showing 2·84 in. in 15 days, against the ten years' average of 3·48 in., with 19 wet days. The latter portion of the month has been unusually dry for the time of the year, ·08 in. only having fallen (in four days) from the 12th to the 31st. The total for the ten months is 25·98 in., half an inch below the mean of 1866-75.

J. W. ROBSON, Dalton, 17th Nov., 1876.

RAINFALL IN OCTOBER.—Wakefield.—The rainy days have been 13 in this month, the total rain measured amounting to 2·18 in. The heaviest day's fall occurred on the 8th, to the depth of 0·96 in. The winds to the 20th have been mostly south, after which date no rain fell.

FREDK. HILL, Kirkgate, Nov., 1876.

RAINFALL IN OCTOBER.—GOOLE.—2·05 in.; wet days, 9; greatest fall on any one day, 0·8 in., on Oct. 8·9. No rain fell during the three weeks October 13 to November 3.

H. FRANKLIN PARSONS.

VELVET SCOTER (*Anas fusca*).—A fine mature male specimen of this duck came into my possession, killed at Talkin Tava, near Brampton, Cumberland, on the 3rd of November.

G. PARKIN, Brampton, Nov. 21st, 1876.

Reports of Societies.

BRADFORD NATURALISTS' SOCIETY.—Meeting October 31st, the president in the chair.—Mr. J. Keeton exhibited the following moths :—*Himera pennaria*, *Hybernia aurantiaria*, *H. defoliaria*, &c. Mr. J. W. Carter read an interesting paper on “ The Fertilisation of Flowers,” in which he first described the various parts of the flower, and entered more largely into the particular construction of the stamens, ovaries, and pistil, showing how the presence of the pollen on the stigma is requisite for the fertilisation of the ovule, and the production of perfect seeds. He described some variations in the position of these organs in certain orders, and indicated that although each flower is in most cases furnished within itself with the necessary apparatus for its own fertilisation, yet it is not

always, perhaps not even generally, that the ovule is fertilised by pollen from its own anthers, and that as a rule it is found that cross-fertilisation produces finer plants in the next generation than self-fertilisation, in illustration of which he quoted a number of instances from Mr. Alfred W. Bennett's lecture at Manchester.—J. W. W. BROOK, Hon. Sec.

GOOLE SCIENTIFIC SOCIETY.—A meeting of this Society was held at the Board Schools, Goole, on Wednesday, November 8th, when a paper was read by Dr. Parsons, giving a brief account of the general arrangement of the British strata, and a summary of the principal geological observations made by the Society and its members during the past season. The lecture was illustrated by diagrams, and by a number of fossils exhibited by Mr. J. T. Atkinson, president of the Selby Naturalists' Society, Messrs. Pease and Bunker, and Dr. Parsons. A short discussion followed, in which Messrs. J. Tindall (of Huddersfield), Savage, and others took part. The president, Mr. Hunter, announced that he had received from the Plymouth Institution two of that Institution's annual volumes of transactions, as a donation to the Society's library.—H. FRANKLIN PARSONS, Sec.

HECKMONDWIKE NATURALISTS' SOCIETY.—Monthly meeting, November 11th, Dr. Oldfield, president, in the chair.—The principal part of the evening was spent in discussing the resolutions passed at the annual meeting of the West Riding Consolidated Naturalists' Society, and on being put to the meeting it was decided to elect a delegate to represent the society on the Council.—J. DEARDEN, Hon. Sec.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—230th meeting, October 24th, Mr. Samuel Jefferson, F.C.S., president, in the chair.—Mr. Edward Atkinson, F.L.S., F.Z.S., read a paper on "The Fauna and Flora of Lebanon and Lower Syria, in connection with their climatal conditions." He pointed out the great influence exercised by the physical configuration of the country upon its fauna and flora. Broadly speaking, the country was composed of two nearly parallel ranges of mountains running from north to south—Lebanon and Anti-Lebanon—separated by a vast fissure or cleft, known as the valley of the Jordan, the deepest depression in the world—the surface of the Dead Sea being 1292 feet below the level of the Mediterranean. The great difference in climate produced thereby re-acted on the fauna and flora, which, being Palæarctic in its affinities with some admixture of Ethiopian and Oriental forms, was tropical on the coast and in the Jordan valley, temperate in the hill country of Palestine, and in one or two places in the mountains of a boreal or alpine type. The existence of the latter showed in conjunction with the existence of undoubted ice-markings, that the country had once partaken of the influence of a glacial period. A large amount of detailed information was given by Mr. Atkinson, whose former residence at Jerusalem entitles him to speak on the subject.

231st MEETING, October 31st, Mr. Henry Pocklington, F.R.M.S., V.P., in the chair.—Mr. Charles H. Bothamley exhibited a fine piece of fluor-spar from St. John's Cave, Weardale. Mr. W. E. Clarke exhibited a large and interesting series of eggs of sea-birds collected by him this season on various parts of the coast, including the eider duck, puffin, razorbill, guillemot, cormorant, black-headed gull, kittiwake, and lesser black-backed gull. Mr. John W. Taylor brought a number of shells, including specimens of *Helix albolabris*, *H. multilineata*, and *H. profunda*, from Iowa, U.S.A., showing very beautiful variations from the normal form. Mr. Arthur A. Pearson exhibited a number of microscopes, lamps, cabinets, and numerous accessories, with a view of bringing under the notice of the members well-made instruments at unusually low prices, two of the instruments being after the design of Mr. Washington Teasdale, of Leeds.

232ND MEETING, November 7th, 1876.—Mr. John Grassham, V.P., who was in the chair, showed larva of the second brood of *Antheraea pernyii*, feeding on oak; unusually large poplar leaves, 9in. by 10in. or so; and a copy of the "Leeds Mercury" of Dec. 1st, 1792, calling attention to a Mayor's proclamation as to the price of bread. Mr. William Brook showed some galls, and a locust which had been taken this year in a field near the Horticultural Gardens, Hyde Park, Leeds. Mr. Henry Pollard showed a cray-fish from Meanwood, and a number of sea-urchins from Whitby. Mr. C. H. Bothamley brought minerals, including chalybite or siderite from Weardale; clay ironstone, Cleveland; haematite and blonde, Cumberland; galena, massive, Weardale; and galena, crystallized, Cumberland.

233RD MEETING, Tuesday, November 14th, 1876.—Mr. Samuel Jefferson, F.C.S., president, in the chair.—Mr. S. Everard Woods read a paper on "The reasoning powers of Caterpillars." After pointing out the beauty and variety of caterpillars, and the diversity of their forms and habits, and enumerating the several instincts observable in the caterpillar, the chrysalis, and the butterfly, he went on to show that through these transformations the identity of the insect remains unchanged, and that the instincts of the one must, in a latent form, be preserved in the brain system of the other. Instinct and reason were described as two different faculties (rather than lower and higher degrees of the same faculty), both common to man and to all animated nature, but in widely different proportions. Mr. Wood defined instinct as "that intuitive faculty which conveys the knowledge of how to act with the best results, in a state of nature;" and reason as "the power of connecting ideas, and drawing an inference." Certain habits observable in caterpillars were then detailed, tending to show the existence of their capacity for deduction from premises, and consequently of their reasoning powers. Notice was also drawn to the remarkable identity in colour between

certain larvæ and the plants from which they feed, and to a power, obscure in its origin, apparently equal to a "sixth sense," observable in certain moths. There was afterwards a discussion, taken up by Messrs. John Grassham, B. Saynor, S. Schofield, W. Howgate, A. A. Pearson, and the president. —W. D. R.—[We shall shortly publish this paper *in extenso*.—EDS. NAT.]

MIRFIELD NATURALISTS' SOCIETY.—At the monthly meeting of this Society, held on the 4th November, Mr. Edwin Stoks was elected as delegate to the West Riding Consolidated Naturalists' Society.

NOTTINGHAM NATURALISTS' SOCIETY.—Meeting Nov. 13th, Mr. W. Rigbey, the president, in the chair, who exhibited some fossils collected in Derbyshire from lime and lead quarries ; Mr. W. Thompson; a fine specimen of the cormorant, also a buff variety of the common sparrow ; Mr. T. B. White, the curator, a good specimen of the red-throated diver ; and Mr. Fox, three splendid specimens of *Acherontia Atropos*, which he had bred from four larvæ. The velvet scoter, shot on the Trent, was also shown by Mr. T. B. White, and *Chelonia plantaginis* (second brood) ; Mr. Atkin, conchological specimens collected in the neighbourhood of Nottingham ; Mr. Wright, specimens of *Thecla pruni*, *Thecla W-album*, *Hesperia Actaeon*, *Colias Edusa*, *Stauropus fagi* ; Mr. Lamb, *Dianthecia albimacula*, *Plusia orichalcea*, *Lycæna Boetica*, and *Cucullia chamomillæ*. Mr. Lamb also gave a very interesting and practical lecture on bird preserving, which was listened to with much interest. —R. LAMB, Hon. Sec.

OVENDEN NATURALISTS' SOCIETY.—The annual meeting of this Society was held on Saturday, November 4th, Mr. T. Scott in the chair.—An excellent series of geological specimens was laid on the table. Mr. James Spencer exhibited a collection of Miocene fossils from near Lisbon, sent to him by Mr. Geo. Robinson, of Portalagre. The specimens were in an excellent state of preservation, and were valuable illustrations, not only in themselves, but as illustrating a formation which is almost absent in our English strata. Among the specimens were a very large oyster, about twelve inches in length ; *Myra turritella*, &c. He also named the following specimens, collected by Messrs. Scott and Cockcroft :—A very fine slab from Windy-bank, containing *Goniatites Listeri*, *Sternbergia*, from the new railway cutting ; and the following fossils from the Ringby quarries : *Lepidodendron*, *Halonia regularia*, *Ulodendron* and *Cardiocarpon*. Mr. T. Hirst exhibited and named a number of birds, including pair of bitterns, pair of chintz owls from America, and also a very small pair from the same place ; barn owl, and the screech owl ; a squirrel from Craven ; and a pheasant from Lady Irwin's park, Leeds. The officers were elected for the coming year, viz., president, Mr. T. Scott ; treasurer, Mr. S. Hirst ; general secretary, Mr. J. Ogden. The affairs of the Society are in an excellent condition.

STAINLAND NATURALISTS' SOCIETY.—Monthly meeting, Nov. 6th, the president in the chair.—The following specimens were exhibited : by J. E. Garside—pair of redwings, the grey and flying squirrels, and striped snake brought from America by T. Smithies, Elland ; by A. Smith, hare tail grass, and a pre-historic implement dug up with other fossils at North Dean Mills. Several flocks of wild ducks passed up Calder Valley on November 5th. Mr. C. C. Hanson was elected to represent the Society on the Council of the West Riding Consolidated Naturalists' Society.—W. H. STOTT, Hon. Sec.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly meeting November 2nd, Mr. W. Talbot in the chair.—The secretary laid on the table the following books :—“ Morris' British Birds' Nests and Eggs ” (3 vols.) ; “ Carpenter on the Microscope ;” “ Nicholson's Palaeontology ;” “ Rye's British Beetles ;” Smith's Bees.” The above works have been purchased for the Society by the donation of £5 from Hy. Mason, Esq., St. John's, Wakefield, for which a vote of thanks was unanimously accorded. Mr. W. Talbot was then elected delegate to represent the Wakefield Naturalists' Society in the West Riding Consolidated Naturalists' Society's council, with J. Wainwright, Esq., F.L.S. Mr. W. Talbot exhibited three female *D. templi*, taken near Huddersfield. Mr. Hall, male and female *D. templi*. Mr. Wilson, a beautiful series of *E. apiciaria*, bred, and eggs ; also two of the same caught in the field, which served to show the remarkable difference between those taken by the net and those bred.

J. SPURLING, Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting, November 8th, Mr. Morgan, M.R.C.S., in the chair.—Mr. Helstrip exhibited a very beautiful case of white kittens ; Mr. Ripley a very fine Albino example of the common jay (*Garrulus glandarius*) shot near York last October ; also a specimen of the blackbird (*Turdus merula*), with white head ; M.. Simmons a box of beautifully-preserved larvæ, the work of Mr. Doncaster, of Sheffield ; Mr. Robinson fine series of *Noctua ditrapezium*, *Phycis ornatella*, *Rodophœa suavella*, and *Carsia imbutata* ; Mr. Carr the mouth of a jelly fish eater ; the secretary (Mr. Prest) two remarkable varieties of *Smerinthus tiliæ*, one also of *Phigalia pilosaria*, *Chœrocampa celerio*, taken by Mr. Ralph Shaw, near Ryemouth, Berwickshire ; and a specimen of that fine and rare British moth, *Catocala fraxini*, commonly called the Clifton Nonpareil, taken by Mr. William Shaw at Netherbyres, Berwickshire, on the 11th September last. Mr. C. D. Wolstenholme then read a very interesting paper on the cuckoo (*Cuculus canorus*), minutely describing the habits of this peculiar bird, and illustrating his remarks with a very fine case of both mature and young birds, also with eggs of the same. Mr. Webster gave notice that he would read a paper at the next meeting on the India-rubber tree.

W.M. PREST, Hon. Sec.

Diary.—Meetings of Societies.

- Dec 2. West Riding Consolidated Naturalists' Society : Council Meeting at Wakefield.
,, 5. Bishop Auckland Naturalists.
,, 6. Entomological Society of London, 7 p.m. Goole Scientific Society—Paper : "The Radiometer and its Teachings."—Major Best.
,, 7. Linnean Society of London, 8 p.m.
,, 9. Heckmondwike.
,, 11. Huddersfield Naturalists.—Annual Meeting.
,, 12. Leeds Naturalists' Field Club and Scientific Association Paper : "Concerning Echini."—W. Percy Sladen, F.L.S., F.G.S., of Halifax.
,, 13. York and District Naturalists.
,, 14. South London Entomological Society, 8 p.m.
,, 19. Leeds Naturalists' Field Club and Scientific Association —Paper : "Prehistoric Man—Geologically, Ethnologically, and Archaeologically Considered."—Peter Gilston.
,, 20. Ovenden.
,, 21. Linnean Society of London.
,, 28. South London Entomological Society.

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No. XVIII.

JANUARY, 1877.

VOL. II.

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Original Articles.

THE BIRDS OF WAKEFIELD:

With particulars of the occasional visits of Rare Species, and of those that have been observed to breed in the neighbourhood,

FROM 1845 TO THE PRESENT TIME.

(Concluded.)

BY WILLIAM TALBOT.

ALCADÆ.

BLACK-HEADED GULL (*Larus ridibundus*)—

Scarcely a winter passes without one or more being shot in Cold Hiendley reservoir or the river Calder; their visits to us are generally made on their passage westwards. I have two in my collection, one of which was killed on the river, and the other in the reservoir.

KITTIWAKE (*Larus tridactylus*)—

Unless disturbed by the fear of a gun, these birds usually spend a few days on the Calder during their flight to the west. I have seen several specimens which had been shot in this district during the months of February and March.

LESSER BLACK-BACKED GULL (*Larus fuscus*)—

Mr. W. Firth shot a remarkably fine bird in August, 1851, at Horbury; others have been killed at Kirkthorp dam.

HERRING GULL (*Larus argentatus*)—

Is an occasional visitor; I have one in my collection which was shot by Mr. Firth in March, 1859, on the old Calder, whilst it was in its transition state from the grey dress to its summer plumage. Since the above date, others have been shot in the neighbourhood.

GREAT BLACK-BACKED GULL (*Larus marinus*)—

One was shot by Mr. Harrison at Patterdale, which is a favourite resort of wild ducks in the winter season; another was shot on the Calder, and sent to Mr. Lumb to be preserved.

POMARINE SKUA (*Lestris Pomarinus*)—

One was shot at Carlton, near Rothwell, on the 7th October, 1870, and it was given by Mr. Wigglesworth, of Wakefield, to Mr. Lumb. It is now in his collection.

RICHARDSON'S SKUA (*Lestris Richardsonii*)—

In 1849 one was shot at Horbury by Mr. Firth, and it was called by him the Black-toed Gull, which I find is a local name, according to Morris, for this bird; another was shot by the same person, and sent to Mr. Wright to be stuffed, who named it the Black Gull, and who from his knowledge of the bird appeared to have had specimens previously in his possession; a third was shot at Kirkthorp dam, by Mr. J. Hartley in February, 1863, and on the 3rd of September of the present year one was killed by Mr. Jewison, near Lockhouse, Kirkthorp.

STORM PETREL (*Thalassidroma procellaria*)—

This harbinger of foul weather, and sailor's dread, was shot at Bilham fishpond in 1845, by Mr. Parkin, the gamekeeper. I saw it, prior to its being returned to Bilham House, in the hands of Mr. Hugh Reid, of Doncaster, to whom it had been sent to be preserved.

In concluding my list with this bird of ill omen, I hope it will not be regarded as an augury of disaster to the winged fowl which have hitherto frequented this district. I have no doubt that as the study of Natural History advances it will tend to promote the preservation of our feathered friends, and I trust that in the course of years many birds which have been driven from our woods will again be hailed as welcome visitors.

In compiling this list of the Birds of Wakefield and the district, I have not attempted to give any description of the birds or their habits, but I have in most instances simply transcribed from my diary, in which, from a keen sympathy with the denizens of the air, I have carefully stored my observations in ornithology for many years.

Although we are not in the neighbourhood of any forests, nor can we boast of many large woods in the district, yet it is abundantly clear that we are favourably situated for birds, as is shown by the number of rare specimens which have from time to time been found in this locality. Some of the woods—especially Bullcliffe, Haw Park, New Park Spring, and Bushcliffe—are remarkably rich in summer warblers, whilst in a less degree Newland, Nostell, Hickleton, and Woolley are favourite resorts of singing birds. All these places, with the exception of Newland, which is towards the east, are on the south of Wakefield; in the west we have Newhall and Bank Woods, which are famous in winter for woodcocks; towards the north there is but little cover, and therefore scanty attraction to our feathered pets.

As regards water fowl we are exceptionally well placed—situated almost midway between two seas, we have within an easy walk of the town no less than seven lakes or ornamental sheets of water, nearly all of which are well wooded to the brink ; in addition we have two large reservoirs and numerous pools ; we have also converging upon Wakefield several streams which are the home of the kingfisher and the moorhen, and where occasionally in winter the water-rail may be found. The Calder, which runs from west to east, abounded, before its waters were polluted, with wild ducks in autumn and winter, and the large beds of shingle in various reaches of the river were, and to some extent still are, a great attraction to the piper family.

I am greatly indebted to numerous gentlemen and friends whose names repeatedly appear in the foregoing pages, and who have kindly given me free access to their collections, and have furnished me with much valuable information.

15th December, 1876.

THE BRITISH PYRALES.—*Concluded.*

By G. T. PORRITT, F.L.S.

THERE are five British representatives in the genus *Ebulea*, viz :—*Crocealis*, *catalaunalis*, *verbasalis*, *sambucalis*, and *stachydalis*. Of these, *sambucalis* only occurs in this district, but it is very plentiful. I have seen an elder tree in my father's garden at Clare Hill almost stripped of its leaves by the larvæ. *Crocealis* is very generally distributed, and plentiful where its food-plant, the fleabane (*Inula dysenterica*), abounds. I have reared a fair number this and last year, and published a description of the larva in the "Entomologist" of April last. I have taken the imagos abundantly at Chattenden, in Kent. Of *catalaunalis* I know nothing, except that its larva is said to feed on *Linaria spuria* in August, and that a single example of the imago was exhibited at a meeting of the Entomological Society of London, taken by Mr. W. C. Boyd, at Cheshunt, September 18th, 1867. *Verbasalis* I have never seen alive, though I believe it is a common Kent moth ; my series was sent to me from Norwich, by Mr. C. G. Barrett. *Stachydalis* was only added to the British list last year, and is another of the species brought forward by the indefatigable Mr. C. G. Barrett, who captured an odd example near Pembroke, and having obtained the clue, searched for it again this year, to be rewarded with a number of specimens amongst its food, *Stachy*

sylvatica.* Like other of the Pyrales, it seems to prefer isolated and somewhat stunted plants, as Mr. Barrett failed to find a specimen in spots apparently very suitable, and where the plant grew luxuriantly. Although only brought forward last year, several specimens had evidently been taken previously, and were mixed up in collections with *sambucalis*, to which species, as you may see from the example in my cabinet, it bears a very striking resemblance. Mr. McLachlan discovered one amongst his series of *sambucalis*, as did also Mr. Bond in his ; the latter gentleman informed me he took his some years ago at Kingsbury. No doubt there are others scattered over the country, and I shall not be surprised if, when thoroughly known and carefully looked for, it becomes a comparatively common species. Mr. Barrett says it is readily recognised when on the wing, as it looks much more like *Scopula olivalis* than *Ebulea sambucalis*. The larvæ of this genus are much more sluggish than those we last considered, and feed in webs spun under or between leaves. All the imagos fly between June and August.

Pionea, the next genus, has three species : the first being the well-known "Garden Pebble," *forficalis* ; the others *margaritalis* and *stramentalis*. *Forficalis* abounds in every kitchen garden in this district, as I suppose it does also in every other in Britain. It flies with a slow conspicuous motion amongst the various vegetables, depositing its eggs on cabbages, horse-raddish, &c., on which its larvæ feed. When full-grown, in the autumn, the larva spins a rather compact cocoon in crevices on palings, &c., but instead of changing to a chrysalis in a few days, as do those of most lepidoptera, it remains within the cocoon all winter, and changes in spring. Not that this is the only species in which this trait occurs, as others in genera we have already considered, as well as a few species in the earlier orders of the lepidoptera also have the same characteristic. Of *margaritalis* and *stramentalis* I know but little personally ; the former seems to be common in the various fenny districts, and the latter is taken freely in many places in the south,—my own series, I believe, was sent to me, by Mr. G. B. Corbin, from the New Forest. The larva of *margaritalis* is found in August, under a web amongst the seed-heads of wild mustard, but although it appears to feed up in autumn, like *forficalis* it does not become a pupa until spring. The early history of *stramentalis*, I believe, is quite unknown. The imagos of all three species fly at midsummer.

* A history and description of the supposed larva of this species, by Mr. William Buckler, is published in the "Entomologists' Monthly Magazine" for November last.

There are three species also in the next genus, *Spilodes* : *sticticalis*, *palealis*, and *cinctalis*. None of them are rare, although all are rather local. The first, I believe, has been taken in this neighbourhood, and also at Halifax, though I have never met with it myself; my late friend, Mr. T. Wilkinson, used to get it at Scarboro', and no doubt it is to be obtained in other parts of Yorkshire. *Palealis* has its head quarters at Folkestone, where it is plentiful, and indeed this used to be considered its only British locality. The last year or two, however, it has been taken much nearer London; and in August last the Rev. P. H. Jennings, M.A., sent me some larvæ he had found feeding in webs amongst *Daucus Carota*, near Gravesend, which I have little doubt will prove to be those of this insect. *Cinctalis*, so far as I know, is entirely a southern species. *Sticticalis* feeds on *Artemesia* in June and July; *cinctalis* on broom in June; and *palealis* on wild carrot in August. The two former fly in July and August, *palealis* in June and July.

The only species contained in the next genus, *Margarodes unionalis*, is exceedingly rare, and I know absolutely nothing of its life history; the only specimen I remember to have ever seen is in a collection of Mr. J. P. Barrett, who took it on a gas lamp between Camberwell and Forest Hill, October 17th, 1869. Two others were captured the same year. Its caterpillar has been said to feed on privet in May, but this I cannot vouch for.

The next genus, *Scopula*, is an interesting and well-known one, as it contains amongst its six species, *alpinalis*, *lutealis*, *olivalis*, *prunalis*, *ferrugalis*, and *decrepitalis*—several of our most plentiful Pyrales. *Lutealis*, *olivalis*, and *prunalis* all occur freely in this neighbourhood; *lutealis*, indeed, swarms on every weedy bank in July and August, flying in scores at dusk, and is constantly disturbed as we walk along in the daytime. Notwithstanding its abundance, however, nothing is known of its larva, except that it is said to feed on coltsfoot. I have done my best to work out its life history, but although I have had numbers of the females imprisoned amongst a variety of plants, not an egg could I ever induce one of them to deposit. I have also watched repeatedly the moths at large, both at dusk and late at night, in the hope of seeing them deposit their eggs, but although I have carefully seen them fly and settle on almost all kinds of plants, I could never detect one in the act of oviposition, nor could I find an egg on any of the plants frequented by them. Searching for the larva, too, has always been equally futile, although I have been convinced there must have been scores within a few feet of me. I fancy I have had

the larva of *olivalis* or *prunalis* from bramble, but I am not certain, especially as the former is said to occur on ground ivy and other low plants ; and *prunalis* on sloe as well as low plants. *Alpinalis* is a more local species, occurring on the Scotch mountains, especially in Perthshire ; some of my own specimens were sent by Mr. J. J. King, of Glasgow. It flies in July, and its caterpillar is said to be found on ragwort in June. *Ferrugalis* is a common southern species, and is one of the latest of its order in its time of appearance, being on the wing from August to October ; its caterpillar is unknown. *Decrepitalis* is found only in the north, Perthshire probably yielding most specimens, though I fancy I have heard or read of its occurring in the English Lake District. Its early history is also quite unknown.

The next genus has only one species, *Lemodes pulveralis*. It was discovered at Folkestone several years ago, and although a fair number of specimens are taken every year by Mr. Wm. Purday and others (my own were taken by the collector above named), it has not yet been detected in any other spot. The larva feeds on *Mentha aquatica* ; the moth flies in August.

Of the single species in the next genus, *Mecyna polygonalis*, I know nothing beyond that its larva is reported to feed on flowers of *Ulex nanus*, on heaths ; and the only imago I know of is one taken by the Rev. A. H. Wratislaw, on a railway bank, near the town of Bury St. Edmund's, in September, 1868.

Stenopteryx hybridalis, the only representative in the next genus, is a well known species nearly everywhere, though I have never seen it in this neighbourhood. I fancy, however, I have heard Mr. Varley say he has taken it here occasionally. I have been considerably teased with it on the Southport sandhills, as when it gets up on the wing it looks a much larger moth than it really is, and is consequently very deceptive. It flies in a peculiar manner, and is a difficult thing to get hold of, as (to quote Mr. Stanton's words) "after a careful search at the very spot it appeared to settle, just as the collector despairs of meeting with it, it suddenly starts up from under his very nose, to settle a few yards further on." It is on the wing from May until August or September, but although so very plentiful I believe its early history is unknown.

We now come to the last family in the Pyrales—the *Eudoreidæ*, containing only one genus, *Eudorea*, but that the most extensive in the whole order, as it contains no less than twenty species. Every lepidopterist is perfectly familiar with the insects in this group, as one species or another is almost sure to be met with in nearly every

collecting expedition during the summer. They may be noticed in numbers sitting in a triangular position on trunks of trees in woods, on hard rocks on the cliffs, on stones &c., on mountain sides, and in fact in almost all conceivable situations. They have, however, a very awkward habit of starting off directly one comes near them, when they fly with a quick jerking flight, and take a similar position a few yards away, to repeat exactly the same performance, though even more warily when you come up with them. Common as they are, the group is a most neglected one, indeed very few lepidopterists seem to take any real interest in it, or to study the species systematically. Several reasons may account for this. In the first place there is a great similarity between the species, which makes it intensely difficult to determine them at first, though this wears off when we get accustomed to them. In the next place, captured specimens are often very worn, or if fresh, must be killed and pinned at once, or they will make themselves altogether unrecognizable in a very short time after being shut up in a pill-box, so that, if difficult to determine when fresh, they are tenfold so when in bad condition. Their somewhat obscure, dingy appearance, too, doubtless deters many from taking as much interest in them as they otherwise would. Seven of the species occur with us, viz., *ambigualis*, *cembralis*, *pyralalis*, *muralis*, *mercurialis*, *truncicolaris*, *coarctalis*. Besides these I am not sure that we have not *basistrigalis*, and perhaps *scotica*. In my series of *ambigualis* taken here, Mr. J. T. Carrington (the recently appointed Editor of the "Entomologist") picked out two specimens which he said were *basistrigalis*, and as such they have since stood in my cabinet; I however do not know the species sufficiently well to judge. I hope they may be right. *Ambigualis* is a most abundant moth in our woods, and *pyralalis* occurs in similar situations. *Cembralis* swarmed in my garden in July and August last; *muralis* is common enough about old walls, as indeed is *truncicolaris* also; *mercurialis* turns up on trunks of trees, &c.; whilst *coarctalis* seems partial to our hilly moorland districts, and is not uncommon in such situations, as at Marsden. *Basistrigalis* is a comparatively recent addition to our list, and was first brought forward as a distinct species by Dr. Knaggs; it is said to be common about Rannoch, and has doubtless been overlooked in many localities. *Zelleri* is perhaps the largest species in the group, generally being a little bigger than *cembralis*, to which I believe it bears some resemblance; it was added to the list in 1867 on the authority of a specimen taken by Mr. Pryor at Norwood Junction, August 17th

that year, and in the July following one was captured at Carmarthen by Mr. Horton. Since then it has been more generally taken. I don't know where *ulmella* is to be got; the first were taken by Mr. Dale many years ago, on the trunk of a wych elm at East Meon. *Scotica* was brought forward several years ago by Dr. F. Buchanan White, F.L.S.; it very much resembles *cembralis*, but is darker in colour. I have remarked before that I am not at all sure we have not the form in our own neighbourhood; anyhow I have an example in my cabinet, unfortunately without locality, but which I think in great probability was taken here, which I can in no way separate from a specimen of the true *scotica* (which by the way I am inclined at present to consider only a variety of *cembralis*) received from Scoonieburn, near Perth. *Ingratella* is also a comparatively recent species, being first noted in 1867 by Dr. Knaggs from specimens he had taken in abundance in the celebrated warren at Folkestone; probably it only wants looking for to be turned up freely in other localities. *Lineolalis* I have never seen alive, and know but little about it, though it is said to be common at Doncaster. *Crataegalis* is a generally plentiful insect, both in the northern and southern counties; all my specimens came from Norwich. *Resinalis*, to my mind one of the prettiest of the group, is also widely distributed and tolerably common; but *phœoleuca* is rare, being recorded from but few localities as yet. It is taken in the Isle of Portland. *Atomalis* and *gracilialis* are both Scotch species, but the former is very plentiful where it occurs in Perthshire. *Alpinalis* is also a Perthshire moth, but I believe is of not unfrequent occurrence in some of the English counties, and if I mistake not it has been taken, during the season just over, by Mr. J. P. Parrett, in the Norfolk fens—a spot with which its name certainly has no connection. The last species, *pallida*, is a tolerably common one, occurring freely at Scarborough amongst many other localities.

The imagos of the species I have tested deposit their eggs tolerably freely, and the larvæ seem easily reared. They are nearly all moss feeders, different species frequenting different mosses. A lot of eggs of *muralis* just about hatching, which I placed on a pot of growing moss last May or beginning of June, fed up very rapidly, so much so that the second brood of moths was out in July. The larvæ of many of the species are totally unknown as yet, and even the mosses they feed upon; some few species indeed feed upon lichens, as *resinalis* on lichens growing on ash trees in April, and *lineolalis* or lichens on sloe, in June and July. Of those eating mosses which are known,

muralis is on *Grimmia pulvinata*, *Bryum capillare*, &c., in March and April; *mercurialis* and *cratægalis* on *Hypnum elegans* and *Jungermannia dilatata* also in March and April; and *ambigualis* and *cembralis* on the same mosses in May; the others all seem to be doubtful. When full grown they spin rather tough silken cocoons amongst the roots of the mosses, and in them turn to chrysalids. The imagos fly at dusk, and one species or other is out the whole summer through, the great majority being on the wing in June, July, and August. *Pyralalis* only, appears as early as the beginning of May, and *cembralis* is the only one I have noticed as late as the middle of September; I believe however that *coarctalis* is on the wing even in October, and hibernates to April following.

With this I bring this paper to a close. I think I have related pretty nearly all I know of the order we have been considering, and although I know full well how very little it really is, I trust I may have said sufficient to prove that this neglected order is a most interesting one, and that some member of this Society at least may be induced to pay a little more attention to it than he has hitherto done.

Short Notes and Queries.

RAINFALL OF NOVEMBER.—Huddersfield.—The total for the month has been 3·31 in., which fell in 18 days, making a total in the eleven months of 29·29 in. The heaviest day's rain (0·90 in.) occurred on the 18th. As compared with the period 1866-75, the month's result is 0·41 inches in excess of the usual November rainfall, and the eleven months' total 0·07 inches less than the average.—J. W. ROBSON, Dalton, 4th Dec., 1876.

RAINFALL IN NOVEMBER.—Wakefield.—A very rainy, damp month, rain having fallen on 19 days (including snow on two days), the aggregate amount being 3·45 inches. The heaviest day's fall occurred on the 12th, to the depth of 1·11 in.—FREDK. HILL, Kirkgate.

RAINFALL IN NOVEMBER.—Barnsley.—350 ft. above sea, height of gauge 36 in.; 3·70 in. on 17 days. Greatest fall Nov. 12th, ·97 in.—Ingbirchworth Corporation Waterworks: height above sea, 853 ft.; of gauge 16 in.; 4·72 in. on 19 days. Greatest fall November 12th, 1·17 in.—T. LISTER.

RAINFALL IN NOVEMBER.—Goole.—2·58 in.; wet days 18; greatest fall on any one day, ·54 in. on November 12th.—H. FRANKLIN PARSONS.

HEN HARRIER AT HEBDEN BRIDGE.—On Nov. 30 I had the pleasure of seeing a female hen harrier (locally called the ringtail), at Burlees, Hebden Bridge, at 2 p.m. Its flight answers to the description of

Yarrell and other ornithologists, it is performed apparently without much labour, is easy and buoyant, but not rapid, and generally within a few feet of the surface of the ground.—JAMES VARLEY, Almondbury Bank, Huddersfield, December 11th.

ALBINO PHEASANT, &c., AT HUDDERSFIELD.—A perfectly white and beautiful specimen of the common pheasant (*Phasianus colchicus*) was shot by one of Lord Dartmouth's party when shooting in Roydhouse Wood on the 27th September last. I was present at the time, and had the bird in my hands. The woodcock (*Scolopax rusticola*) was shot in the same wood the previous day. About a week later an owl was shot by Edward Culley about a mile away.—EDWARD TAYLOR, Almondbury, Huddersfield, December 1st.—[Was the owl the short-eared species? We are told several of it have recently been killed in the district.—*Eds. Nat.*]

Reports of Societies.

BRADFORD NATURALISTS' SOCIETY.—Meeting Nov. 28th, Mr. J. Firth, V.P., in the chair.—An interesting lecture on astronomy was given by Mr. B. Illingworth, which was illustrated by diagrams, and was followed by an interesting discussion.—J. W. W. BROOK, Hon. Sec.

GOOLE SCIENTIFIC SOCIETY.—A meeting of this Society was held on Dec. 6th, when the president, Mr. E. Hunter, read a paper on "The Phosphates of Commerce." The author said that the phosphates of commerce were derived from two classes of sources—animal and mineral. Guano, which contained a considerable proportion of phosphates, although especially valuable on account of the nitrogenous matters which it contained, occupied an intermediate position, consisting as it did of the partially decomposed droppings of sea-birds. It was remarkable for the large number of diatoms which it contained, and by which the different kinds might be distinguished. Phosphorus was first obtained from human urine, but the chief animal source of phosphates at the present day was bone. Bone contained about two-thirds of its weight of mineral matter, chiefly tricalcic phosphate. Bones were exhibited from which the mineral matter had been removed by acid; they were soft and flexible. The mineral sources of phosphoric acid were chiefly the native phosphates of lime—phosphorite, apatite, coprolites, and rock phosphate; native phosphates of iron and magnesia were also found and occasionally made use of. Phosphorite was distinguished by its property of phosphorescing with a golden green light, like fluor spar, when thrown upon a hot iron; it was found in Spain. Apatite was a valuable mineral found in the Silurian rocks of Norway, and also in company with iron pyrites in the Laurentian rocks of Canada; it contained sometimes as much as 90 per cent. of tricalcic phosphate. Coprolites, strictly speaking, were fossil dung, and some of the phosphatic nodules so-called were no doubt of that

nature ; but others were fragments of bone, sharks' teeth, and other fossils. Coprolites were found in the Crag of Suffolk, in the upper green-sand of Cambridge and of France, and were formerly worked by Mr. Hunter in the Speeton clay. Rock phosphates were found in Germany and South America ; they were often of marine origin, as shown by their containing fucoids and iodine. The main use of the phosphates was in agriculture ; when used as manure they were converted into "super-phosphate" by treatment with sulphuric acid. The author alluded to the remarkable fulfilment of Liebig's prophecy, uttered more than thirty years ago, that in agriculture concentrated chemical fertilisers would be used instead of bulky manures, as in pharmacy a few grains of quinine have replaced ounces of powdered bark. Phosphorus was obtained by distilling superphosphate of lime with charcoal ; although known for 200 years, it was not employed for lucifer matches till 1833. At that time it cost £4 4s. per lb, whereas now it might be got for 2s. 6d. per lb. The use in recent years of the red or amorphous phosphorus was a great improvement, not only on account of its greater safety, but as saving the matchmakers from a terrible disease of the jawbone, to which they were liable when they inhaled the fumes of yellow phosphorus. Greek fire consisted of phosphorus dissolved in bisulphide of carbon ; it ignited spontaneously on evaporation. Phosphorus was valuable for giving hardness to bronze ; it and some of its compounds were used in medicine.—The lecture was illustrated by analytical tables, by a large number of mineralogic specimens, by chemical experiments and microscopic preparations. After some remarks by the secretary, who thought that the occurrence of phosphate of lime with iron pyrites in the Laurentian rocks tended to corroborate the existence of animal life at that period, and by Mr. W. Smith, a vote of thanks was passed to Mr. Hunter.

H. F. PARSONS, Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—This club was formed on Saturday evening, Dec. 16th, at the residence of Mr. Joseph French, Elmwood House. Its rules provide that meetings and excursions shall be held, at which original papers on scientific subjects may be read, and discussions thereon take place ; specimens exhibited and commented upon ; observations recorded, &c. The club is to consist of not more than 30 members, and no person to be eligible for election who is not a member of some other scientific society, nor shall any person be elected without the assent of three-fourths of the entire members. Meetings to be held on the second Friday in every month, at 8 p.m., subject to alteration.—The first officers were appointed as follows :—President, C. P. Hobkirk ; vice-president, G. T. Porritt, F.L.S. : secretary and treasurer, George Brook. ter. ; librarian, S. D. Bairstow ; curator, Joseph French. It was resolved to join the West Riding Consolidated Naturalists' Society, and that Mr. John Conacher should be the delegate to the Council.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—234th Meeting, Nov. 21st, Mr. John Grassham, V.P., in the chair.—The chairman mentioned that three weeks ago a redwing (*Turdus Iliacus*) was killed near Arthington, and is now in his son's possession. He remarked that it was rather early for the first appearance of this winter visitant. Mr. W. H. Hay showed the skin of a brambling or mountain finch (*Fringilla montifringilla*), which had flown against the telegraph wires at Scarcroft, near Wetherby, and was picked up dead under them on the 17th of November. He stated that the species was a winter visitant, generally diffused all over the county, though by no means common. Mr. Hay also said that when the telegraph wires between Leeds and Wetherby were first erected, birds were often picked up under them, having committed unintentional suicide, but that now the birds seemed to have become acquainted with the wires and avoided them, and consequently very few specimens are now obtained in that way. Mr. Charles Smethurst exhibited a fine rough-legged buzzard (*Buteo lagopus*), which he had the same day (Nov. 21st) taken out of a trap at Bishops Wood, near Selby, and which he had seen on the wing some six weeks ago at the same place. This bird measured 56 inches across the wings from tip to tip. The species is extremely rare at the present time, although a number of examples have been recorded at various times as having been killed in various parts of Yorkshire. The secretary (W. D. R.) mentioned that when in Ripon in the beginning of November, he saw in a bird-stuffer's window in Kirkgate a specimen of one of the buzzards in the flesh, but he could not say whether it was this or the common buzzard. Mr. Smethurst also showed a hooded crow (*Corvus Cornix*) from Bishops Wood, also in the flesh. This bird is a winter visitor in this part of the country. Mr. William Nelson showed two interesting shells, collected near Killingbeck, *Zonites crystallinus* and *Helix pulchella*, variety *costata*. Mr. C. Bothamley exhibited a species of *Sigillaria* (? *oculata*), locality unknown; and Mr. George Brunton brought some seeds of the blue gum tree of Australia (*Eucalyptus globulus*), mentioning that the tree was considered a useful one from a sanitary point of view, and specially suited for planting in cemeteries, especially crowded ones, if it could be acclimatised in Britain.

235TH MEETING, Tuesday, December 12th, Mr. S. Jefferson, F.C.S., president, in the chair.—Mr. W. Percy Sladen, F.L.S., F.G.S., of Halifax, delivered an interesting lecture "Concerning Echini," in the course of which he traced the development and transformations of the sea-urchins in general, illustrating his remarks by means of numerous diagrams. The discussion was participated in by Messrs. James Abbott, W. B. Turner, and the president.

236TH MEETING, Tuesday, Dec. 19th, Mr. John Grassham, V.P., in the chair.—Mr. John Garbutt, F.R.A.S., delivered a lecture upon "The Moon's motion, and its relation to the Tides," which he explained by

means of blackboard diagrams. After a brief discussion and the usual vote of thanks, the Society adjourned over the Christmas vacation.

W. D. R.

OVENDEN NATURALISTS' SOCIETY.—Annual meeting Dec. 9th, when a number of the members and friends sat down to a substantial dinner at the Queen's Head Inn, Illingworth. After the cloth had been removed, the chair was taken by the president (Mr. Baldwin). Mr. Charles Sheard proposed the toast of the evening, "Success to the Ovenden Naturalists' Society." He said he was one of the promoters of that Society, and the only regret he had was that the Society had not been organised 50 years before, and made some remarks on its history. Mr. J. Ogden read the report, which shewed about 60 ordinary and 8 honorary members, also an excellent library of about 100 volumes, and a very rare collection of geological specimens. There have been five local rambles during the summer. Mr. Spencer, in responding to the toast, said he had done what lay in his power to bring the subjects of natural history and geology before the working classes in Halifax and the neighbourhood. They were not destroying life, or wasting anything by their studies. They were not seeking to gain wealth by it, but to benefit those around them. He had endeavoured to elucidate the measures in the district of Halifax, from the lowest measures laid bare in the district to the uppermost part of the Low Moor coal measures. People were little aware what chances they had of studying prehistoric man in this district. When the Romans came to England the inhabitants used stone and a few bronze implements. All before that time belonged to the pre-historic period, as the historical began when Julius Cæsar came to Britain. They knew that at one time this country was occupied by an immense sheet of ice, which came from the north-west, which scratched the rocks, and ground all before it. In Craven they might see foreign boulders brought down by the glaciers, but here they did not see any foreign boulders except in the Calder. Afterwards the whole country sunk beneath the sea, and the grey sand was an evidence of it. The waves levelled the land, and afterwards the country was again raised, and a forest he had mentioned grew upon the bed of grey sand, which was thus formed.

SHEFFIELD NATURALISTS' CLUB.—Annual meeting at the Cutlers' Hall, November 30th, Mr. W. Baker, president, in the chair.—There was a good attendance. Mr. F. Brittain, the hon. secretary, read the report, which stated that the financial position of the club is exceedingly satisfactory, there being a considerable balance in the hands of the treasurer. At one of the meetings Mr. H. C. Sorby, F.R.S., read a paper on "The Evolution of Haemoglobin." There were four excursions during the summer, and each one was very numerously attended. The great want of the Society is a larger number of real students who take a lively interest in natural history. Without this element no so-called naturalists' society can be permanently prosperous. The election of officers was then

proceeded with. Dr. Hime was elected president, and Mr. F. Brittain was elected to his old post of hon. secretary.

STAINLAND NATURALISTS' SOCIETY.—Monthly meeting, December 5th, the president in the chair.—The following specimens were exhibited:—By J. E. Garside, woodcock (female) and the dunlin; S. Peel, pair of ring-tailed harriers. The following singular circumstance was reported by a member:—On Wednesday morning, the 23rd November, two men, who had left off work owing to the rain, were returning home, and at the bottom of Blackley Lane they saw two magpies fighting, and a third watching and chattering in a very excited manner. The men watched the combat for some time, and saw the birds fasten together and roll over on the grouud. They then picked them up and proceeded on their way home, followed for some distance by the third magpie, who kept up a vehement chattering. After they got home, the birds were held facing each other, when they pecked again and bit as savage as game-cocks. They were finally trapped and shot.—C. C. HANSON, Hon. Sec.

TEES VALLEY FIELD CLUB.—At the last meeting at Middlesbrough, Dr. Veitch, hon. secretary, submitted a carefully classified list of the plants that had been found by members attending the field meetings. These numbered 283, and out of the list three or four species have not been previously recorded as occurring in South Yorkshire. It is proposed to extend this list from year to year, and also to devote special attention to other departments of botany than the flowering plants. Mr. Jones, hon. secretary, read an account of the geological matters that had cropped up in connection with the field meetings at Ayton, Force, High Force, Glaisdale, Greta Dale, and Saltburn. —[We propose publishing this report in our next issue.—*Eds. Nat.*]

WAKEFIELD NATURALISTS' SOCIETY.—Special meeting, November 16th, Mr. A. Dickson in the chair.—A paper was read by Mr. Coates from J. Wainwright, Esq., F.L.S., being a Diary of his Continental journey.

MONTHLY MEETING, Dec. 7th, Mr. G. Campbell, V.P., in the chair.—A discussion took place on the advantages of museums in towns, how they increased the knowledge of the different branches of natural history, and that the town ought to provide one.—J. SPURLING, Hon. Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting, December 14th, Mr. M. Smith in the chair.—The secretary informed the meeting that he had, as their delegate, attended the council meeting of the West Riding Consolidated Naturalists' Society at Wakefield, and that for the future the name of the society will be the Yorkshire Naturalists' Union, and the first meeting was fixed for Easter Monday at Wetherby. Mr. G. C. Dennis exhibited some specimens of *Macroglossa stellatarum*, kindly sent by Mr. Alderman Colburn, from Mentone; also *Paecilocampa populi*, and a series of *Anaitis plagiata*, bred from larva taken at Llangollen. Mr. Rowntree, of Scarborough, who was present as a visitor, exhibited some very fine butterflies from Nebraska, and some specimens

of *Scoria dealbata*; Mr. William Simmons a box of fine *Tortrices* and *Tineæ*, also a specimen of Indian corn grown in his garden; the secretary (Mr. Prest) some very fine preserved larvæ, a pair of black *Epunda lutulenta*, variety *Luenebergensis*, taken in Scotland, also a series of *Nola strigula*, *Botys asinalis*, *Dicrorampha tanacetana*, *Cataptria aspidiscana*, and *Argynnus Paphia*, variety *Valezina*, from the New Forest; Mr. Webster exhibited a collection of finely-mounted plants, and then read a paper on the various kinds of India-rubber trees, illustrating his remarks by showing several leaves of trees, different forms of India-rubber, &c.

WEST RIDING CONSOLIDATED NATURALISTS' SOCIETY.—The council of the West Riding Consolidated Naturalists' Society, consisting of seven officers elected at the W.R.C.N.S. last October, and of delegates subsequently elected by the local societies, held its first meeting at Wakefield, on Saturday afternoon, the 2nd December. The officers present were ; Rev. William Fowler, M.A., of Liversedge, president ; Messrs. J. M. Barber of Heckmondwike, Thomas Lister of Barnsley, and H. Franklin Parsons, M.D., of Goole, vice-presidents ; and the two secretaries, Messrs. George Brook, ter., of Huddersfield, and William Denison Roebuck of Leeds. The delegates present were : Messrs. Robert Smith, Heckmondwike ; B. Beevers, Clayton West ; A. R. Kell, C.E., Barnsley ; William Talbot, Wakefield ; C. C. Hanson, Stainland ; James Rothery, Liversedge ; Edwin Stoks, Mirfield ; Allan Boothroyd, Honley ; William Rushforth, Middlestown ; B. Illingworth, Bradford ; John Grassham, William Nelson, and F. Arnold Lees, F.L.S., Leeds ; E. Hunter, Goole ; William Prest, York ; C. P. Hobkirk and J. French, Huddersfield (Literary and Scientific Society). From various reasons the delegates from Ovenden, Ripponden, Holmfirth, Selby, Huddersfield (Naturalists' Society), Rastrick, and Paddock, were not present. The times and places of the meetings for 1877 were arranged as follows :—1. Wetherby, Easter Monday, April 2nd : 2. Sherburn (for Bishops Wood), Whit Monday, May 21st : 3. Nostell Priory, Saturday afternoon, June 16th ; 4. Shipley Glen, Saturday afternoon, July 14th : 5. Goole, Bank Holiday Monday, August 6th : 6. Norland Moor, Saturday afternoon, September 8th : 7. Annual Meeting at Wakefield, Saturday, October 6th. The two secretaries then moved and seconded a resolution that there shall be no increase in the amounts to be levied from the various societies, but that any extra expenses shall be met in some other manner. Mr. Hobkirk supported, and pointed out that the secretaries had proposed this resolution with the view of removing any misapprehensions, and of reassuring the members that they would not be called upon to pay more than they have already done. On the motion of Mr. Hobkirk, seconded by Dr. Parsons, it was resolved that the meetings shall be divided into sections for the purpose of studying the various subjects to greater advantage than has hitherto been done. It was arranged that for the present five sections be formed, and that two members be nominated for each, as the nucleus of a sectional committee, with instructions to add the names

of any members taking interest in their particular department. The first section was arranged for vertebrated animals (including ornithology), with Mr. Thomas Lister of Barnsley, and Mr. William Talbot of Wakefield. Second section : Conchology—Messrs. William Nelson of Leeds, and J. Wilcock of Wakefield. Third section : Entomology—Messrs. Geo. T. Porritt, F.L.S., of Huddersfield, and William Prest of York. Fourth section : Botany—Mr. C. P. Hobkirk of Huddersfield, and Dr. Parsons of Goole. Fifth section : Geology—J. Spencer of Halifax, and J. Tindall of Huddersfield. It was arranged that the sections should meet separately from each other immediately after tea, and examine the whole of the specimens belonging to their department, and that each section should choose its own president and secretary ; that after the sections shall have met for about an hour or so, more or less according to the time at disposal, a combined meeting of the Union shall be held, when the president shall call upon each section in rotation (taking them in different order at successive meetings) to report the most interesting facts brought before it. Thus will be obviated the necessity of naming common things at every meeting, and thus wasting time. Mr. Prest proposed that the name be changed to “The Yorkshire Naturalists’ Union,” urging as reasons in favour of this change that it was desirable to associate certain societies which are not in the West Riding, and also to receive information on the Fauna and Flora of the whole county. The motion was seconded by Mr. Roebuck and carried unanimously. On the motion of Dr. Parsons and Mr. E. Hunter, it was resolved that naturalists residing in places where there is no Naturalists’ Society may be admitted members of the Union on payment of not less than 2s. per annum. The Council agreed that the secretaries should be empowered to issue programmes for excursions when thought desirable. It was decided that the payment of delegates’ expenses at Council meetings be left to the local societies, and that Wakefield be always the place of meeting when not called on excursion days. On the motion of Dr. Parsons, seconded by Mr. F. Arnold Lees, it was resolved “That it be an instruction to the sectional committees to prepare, at the end of each season, a report of the results achieved during the season in their department, such report to be published if considered of sufficient interest by the Council.” After a vote of thanks to the president, proposed by Mr. Hunter and seconded by Mr. Lister, the Council adjourned for tea. After tea the sitting was resumed for the consideration of the proposed testimonial which the annual meeting at Mirfield had resolved should be presented to Mr. J. M. Barber, on his retirement from the secretaryship. After discussion it was arranged that each delegate should request the president of his Society to bring the matter before the members, and to take charge of the contributions. It was resolved that, if possible, the presentation should be made at the Wetherby meeting. Mr. C. P. Hobkirk was appointed treasurer to the fund, and along with Messrs. G. Brook, ter., and Joseph French, a committee to decide upon the form which it is to take.

Diary.—Meetings of Societies.

- Jan. 2. Bishop Auckland Naturalists' Field Club.
,, 3. Goole Scientific—Paper, "The Radiometer and its Teachings."
,, 4. Wakefield Naturalists' (Annual). [Major Best.
,, 10. York and District Naturalists' Field Club.
,, 11. South London Entomological Society, 8 p.m.
,, 12. Huddersfield Scientific Club.
,, 13. Huddersfield Naturalists'.
,, 17. Entomological Society of London, 7 p.m.
,, 18. North Staffordshire Naturalists' Field Club, at Burslem.
Linnean Society of London.
,, 25. South London Entomological Society.
,, 29. Huddersfield Naturalists'.

COMMUNICATIONS RECEIVED :—S. L. Mosley ; S. Everard Woods ; Thomas Lister ; Prof. Newton, F.R.S., F.L.S., &c., ; Dr. Parsons.

EXCHANGE, &c.

A few exotic Lepidoptera for others, or for others on loan to figure. Names and localities required.—S. L. MOSLEY, Almondbury Bank, Huddersfield.

LOCUSTS IN YORKSHIRE.—I am preparing a paper on this subject for an early number of "The Naturalist," in which I propose to give a resume of all captures which have been made in the county. I should be glad to receive additional notes and full information, and also specimens on loan for examination.—WM. DENISON ROEBUCK, 9, Sunny Bank Terrace, Leeds.

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FEBRUARY, 1877.

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Original Articles.

ON THE REASONING POWERS OF CATERPILLARS.

By S. EVERARD Woods.

(*A Paper read before the Leeds Naturalists' Club and Scientific Association, Nov. 14th, 1876.*)

[NOTE.—It will be evident that this Paper was not written for publication. I judge it, however, better to let it appear in its original form, rather than to commence a series of emendations, which would necessitate its being re-written from beginning to end.—S. E. W.]

“We are before we think ; and our consciousness of our own existence is not an inference, but a certainty, anterior to all reasoning.”—“*Philosophy without Assumptions,*” by Archbishop Manning, in “*Contemporary Review.*”

I HAVE chosen caterpillars for the subject of this paper, not because I suppose there to be a wide chasm separating them from other similar forms of insect life, but because I have personally had opportunities, when collecting and breeding lepidoptera, of watching with some attention their manners, habits, and customs.

Those who have not studied entomology will have but a faint idea of the beauty of colour, the variety of markings, the diversity of form, and, I may add, the eccentricity of appearance, presented by British larvæ. They well deserve an illustrated history of their own ; but I much fear that till chromo-lithography arrives at a higher state of development than the present, they will get scant measure of justice.

There are caterpillars that are fat and fleshy, and caterpillars that are lean and flabby ; caterpillars that are smooth as Jacob, and caterpillars that are hairy as Esau ; caterpillars that thrive, like Mithridates, on poisons, and caterpillars that regale themselves, like Jonathan, with honey. There are caterpillars with horns on their tails, and caterpillars with tails on their heads ; while the attitudes they assume range from the dignified to the grotesque.

It will be worth our while to consider here, how are these peculiarities of form, colour and instinct preserved through the intermediate form of the moth or butterfly—a creature with different organs, different capabilities, and consequently different instincts altogether. If from the egg of the butterfly sprang a butterfly, there would be little more wonder than at the egg of a swan producing a cygnet ; but the caterpillar forms a break in the chain. Its instincts impel it to crawl, to climb, to feed, to sleep, to change its skin, and shed its mask ; to spin, to burrow, or to build a sarcophagus, according to its species. The instincts of the chrysalis are limited, at any rate

apparently, as it can do nothing but "wriggle," and sometimes has not the small satisfaction of being able to do even that.

The instincts of the butterfly impel it to struggle from its pupa case, to fly, to feed, to bask in the sunshine, to hide from the storm, to seek for its own kind, and perpetuate its species—and what else? Nothing.

Let me here remark, parenthetically, that it was a beautiful idea of the Greeks to embody their belief in the existence of the souls of the departed by the sculpture of a butterfly on their memorial tablets. A more advanced but less poetical people has adopted a death's head and crossbones as the most fitting emblems for the consolation of the living!

It may be supposed that a butterfly, a creature all life and activity, is possessed of a greater amount of intellection than a caterpillar with comparatively such limited powers; but the instincts of the butterfly must necessarily exist, although latent, in the caterpillar, as in changing its form it does not alter its identity; and I see no reason to suppose that in its final state of existence it displays more intellectual capacity than it did before. And when we consider that the same being has been possessed, at different periods of its life, of entirely different instincts, powers, and capabilities, we are led to enquire, with a curiosity difficult to satisfy, how far does self-consciousness extend? How far does memory reach? Has the insect in the one stage of its existence, any inkling of the future before it? or has the imago, the perfect insect, any recollection of its previous condition? Probably not, but I imagine it would be difficult to prove it an impossibility.

Paley, in his "Natural Theology," when writing on the metamorphoses of insects, puts forward the hypothesis "that in the grub there exist at the same time three animals, one within another, all nourished by the same digestion and by a communicating circulation, but in different stages of maturity." This solution I venture to submit is not satisfactory. If for the term "grub" we substitute "egg" (and certainly what exists in one must exist in the other), the difficulty is still more apparent. Altogether, this explanation of the mysteries of transformation appears to me to be one of those that create a greater difficulty in getting rid of a less; and I am quite at a loss to understand in what sense the caterpillar, the chrysalis, and the butterfly can be considered as "three animals."

I have not been able to ascertain that the sex of the future butterfly

can be determined from the appearance of the caterpillar, although it is probable that the sex is determined at a very early period of its existence. As a rule the female moth is larger in size than the male insect, and it has been observed that a caterpillar of more than ordinary size is almost certain to produce a female insect. There seems, however, absolutely no difference in either the colour or markings of the larvæ, and even in those species the females of which are wingless, or have very rudimentary wings, we may rear from two caterpillars identical in appearance a beautiful male insect with richly coloured wings, and a female consisting of nothing but a body and legs, and much more like a harvest bug or a spider, than a moth.

I have already alluded to the instincts of the caterpillar, but before entering on its powers of reasoning it will be necessary for me to define, as clearly as I am able, what I understand by the terms "instinct" and "reason," what constitutes their difference, and what are their limits.

It is perhaps unnecessary for me to insist that instinct and reason are not different degrees of the same faculty ; yet it is not uncommon to hear the remark that "it is impossible to define where one ends and the other begins." Impossible indeed ! but why ? Because the two faculties, like two parallel lines, seem to run side by side, and therefore never have met, and never can. It is also not uncommon to hear instinct spoken of as a faculty given to the lower animal creation, to serve in the place of the nobler quality of reason vouchsafed to man alone. But on examination I think we shall be compelled to allow that not only has man a large amount of instinct, which probably lessens in its operations as his reasoning powers develop, but that animals of a lower type, although much more dependent than man upon the faculty of instinct, shew beyond the possibility of question very decided signs of the existence of reasoning power.

Another seemingly prevalent notion is, that an exception may be drawn in favour of certain animals—dogs, horses, elephants, parrots, cats, in fact many of those animals most frequently domesticated and associated with man, and whose actions and habits are thus brought prominently into notice. For any such arbitrary distinction I have not been able to find any just cause ; nor am I prepared to admit that these animals, whose intelligence and sagacity are universally acknowledged, have any powers differing, except in degree, from those possessed by the rest of the animal creation. I do not forget that there may be several classes or degrees of instinct, differing widely in

their nature and operation, but they are probably all devoid of anything like deduction from premises.

Instinct, then, seems to be that intuitive faculty which conveys the knowledge of how to act with the best results, with regard to the preservation of life in a state of nature. As soon as an artificial state of existence comes into play, instinct fails to guide, or guides very often wrongly : or, in other words, reason is not powerful enough to correct or modify the promptings of instinct.

Reason, without entering into any deep psychological enquiries, may be described as the power of connecting ideas and drawing an inference; but all reason will not bear the test of logical analysis, as it may often be based upon false premises, and from correct premises a wrong inference may be drawn. For these reasons, the actions of animals will sometimes manifest a perfectly superhuman wisdom, and yet will shew at the same time the most intense and aggravating stupidity.

With regard to the brain system of caterpillars, I must ask to be allowed to quote from the well-known entomological work of Messrs. Humphries and Westwood. Humphries says :—“ Minute dissections and the closest anatomical examinations have proved that though insects are possessed of nerves, they have no well-defined organ representing our brain—the organ of concentrated feeling, where all the nervous conductors meet. They have instead a chain of ganglia, or bundles of nervous substance, from each of which nerves branch out to the contiguous parts, so that the sensations are not all carried to one grand central focus of acute sensibility as with us, but form, as it were, separate systems, any of which might be destroyed without communicating its sensations to the rest.”

It is, however, immaterial for my purpose in what part of the insect the thinking power is lodged—whether in the head, whether in the tail, or whether distributed equally through all the segments ; but I wish to call attention to the fact, that we may sometimes observe in the caterpillar, in addition to its instinctive habits, certain actions which appear to indicate some traces of the operation of the reasoning faculty. There is one remarkable habit common to certain butterflies, moths, beetles, spiders, and caterpillars—that of putting on the semblance of death when captured, or apparently in dread of danger. At such times they will curl themselves up, or fold up their legs, fall helplessly about, and act their part so well, as often to effect their escape. For as soon as the danger is supposed to be

past they will, with great caution, return to life, and then hurry away with unwonted agility. This capacity of acting a part would seem to indicate the existence of the so-called higher faculty, although it might well be argued that instinct, which gives intuitively the knowledge that reason can only attain after a laborious process of comparison and analysis, is actually the more lofty and divine attribute of the two.

“ And Reason, rise o'er Instinct as you can,
In this 'tis God directs, in that 'tis man.”—*Pope*.

Some caterpillars are very easily kept in confinement, and soon content themselves in their artificial existence. Some of the Sphinx tribe will even sit on one's hand and feed in perfect serenity without a sign of fear. Very different in character and temperament is the larva of the goat moth (*Cossus ligniperda*), one of the most difficult to keep, as it not only lives for three years in the larva state, but will eat its way through almost any box in which it may be confined, so long as that box is composed of materials less durable than metal. Disgusting in scent, and savage in disposition, it is the only caterpillar I have ever found unpleasant to handle. It will turn upon its captor and bite with all the strength of its powerful jaws. It cannot be approached without provoking it to a threatening attitude, and it will not feed so long as it is under observation.

If one of these caterpillars is placed in an ordinary glass tumbler, the smoothness of the surface affords no foothold for it, and it vainly endeavours to climb up to the top; but finding its efforts unavailing, it takes the following means of effecting its escape:—Provided with the power common to most caterpillars of producing at will a silken thread (which in many instances is employed in forming the cocoon), it actually forms a ladder of these threads up the side of the glass, and by this means obtaining a secure foothold, climbs to the top; and the prolegs once on the rim of the glass, the caterpillar can draw itself over the side. It would be difficult, I imagine, to include such an action as this under the head of instinct, the conditions being such as instinct is not intended to provide for, Nature not having dispersed glass tumblers, nor anything resembling them, among the haunts of the goat moth. Such an action as this seems to argue an amount of sagacity bordering so closely on reason, that it is difficult to form any theory excluding the operation of the faculty. I am inclined to think that many a mother has considered her child a prodigy for some action of far less intellectual power.

A popular writer, the Rev. J. G. Wood, whose works are perhaps more justly esteemed for being entertaining than for depth or accuracy, remarks that the caterpillar of the puss moth (*Cerura vinula*) "boldly fixes its residence on the exterior of the tree on which it feeds, trusting to its similitude to the bark for concealment." This is a remarkable proposition; for however identical in hue may be the cocoon to the bark of the tree upon which the caterpillar has lived, we can hardly imagine the colour of the cocoon to be exactly a matter of choice, any more than the colour of the larva itself.

The similarity in colour between many caterpillars and the plants upon which they feed is very remarkable, and I think not to be easily explained, as we must bear in mind that the theories of natural selection do not seem applicable to insects in a state of immaturity, and whose existence is perpetuated through a totally different form, possessing very different powers and instincts, and also as a rule totally different in colours. For it is a singular fact that, while the gayest coloured caterpillars produce the dullest of moths, so the most dark and dingy caterpillars develop into the most gorgeous butterflies.

In some cases the cause of the colour of the caterpillar is evident, as in the larvæ of *Cucullia asteris*, which feeds upon the flowers of the China aster. I have noticed that those feeding on the petals of the flower were pink or purple in colour, while those feeding on the leaflets outside the blossom were green; but no difference was observable in the hue of the moths developed. One of the geometers, *Elloplia fasciaria*, which is a silvery green, with longitudinal stripes, exactly resembles the leaves of the Scotch pine on which it feeds. Another small brown caterpillar, with transverse stripes of darker and lighter brown, with two prominent tubercles on each segment, and rows of smaller tubercles, resembles quite as closely the orange-coloured young cones, with their filmy covering, that grow at the ends of the small branches of the same tree.

The larvæ of *Anarta myrtilli* are very difficult to find, from their close resemblance to the young shoots of heather on which they feed, while those of *Smerinthus ocellatus*, the eyed-hawk moth, pale green with transverse white lines, exactly reproduce a segment of the veined leaf of the sallow.

The caterpillar of *Acherontia Atropos*, the "death's head moth," is usually of a pale green colour, with a series of purple, yellow, and white streaks on its sides, and it is noticeable how nearly these colours approach to those of the blossoms of the potato-plant, on the leaves of

which it generally feeds. A remarkable variety occasionally appears in which the front segments are cream-colour, and the rest of the body variegated with shades of brown, while the stripes are so arranged as to give the insect an almost viperine appearance. One of these "sporting" caterpillars was brought to me some years since, and I can therefore corroborate the description given of similar varieties in some entomological works. It is singular that no traceable difference exists in the colouring or appearance of the perfect insect.

It is a matter of general observation that the lower animals seem to be endowed with some power, or faculty, the nature and extent of which we can neither fully appreciate nor properly define, but we may speak of it as a sixth sense, denied to man. What is it that enables the bloodhound to track with unfailing accuracy the man on whom he has been set in pursuit? By what faculty do so many animals find their way home after being conveyed away for many, even hundreds of miles? By what power does a newly-hatched moth attract to its side the male insects—throwing into the shade the marvels of mesmerism and clairvoyance?

I have seen an interesting experiment tried with a newly-hatched female of the common emperor moth (*Saturnia Pavonia-minor*). The moth was put into a box with a muslin lid, was carried to a tract of heath land at three o'clock on a sunny afternoon, and hidden in a patch of heather. Before many minutes had elapsed, up there came, from as far as the eye could follow it, one of the male insects, which are very strong and rapid flyers, and dashing backwards and forwards at gradually lessening distances and narrowing circles, suddenly dropped down upon the exact spot where, hidden in the vegetation, was the box containing the female insect! Before he was captured, another insect appeared, and the process was repeated with the same results. This is a very successful plan for obtaining specimens for entomological purposes, and the experiment is very astonishing when seen for the first time.

This power, or at all events the latent power, must surely exist in the brain system of the caterpillar, as the brain of the infant contains the latent power of intellection, which growth develops into the brain-power of the mature man. In like manner I imagine the instincts of caterpillar must lie dormant in the brain system of the butterfly or moth, and become in this way hereditary.

I have now only to recapitulate in detail what are those mental qualities that seem to be possessed by the caterpillar in addition to its

self-consciousness, or perception of its own existence and identity. The sensation of hunger impels it to eat ; but in its choice of food, its rejection of the wrong plant and its selection of the right one, it exercises discrimination or judgment. In confinement, its attempts to regain its freedom are manifest, but these attempts could not surely be made without the sense of captivity and the desire to escape. Its capacity for dissimulating I have already noticed at some length ; and from its ability to overcome obstacles, and to invent means for accomplishing its purposes, as well as from *the practical uses to which it turns its experience*, I am compelled to draw the conclusion that caterpillars are capable of exercising to a remarkable degree what I have ventured to lay down as the faculty of reason—the capability of drawing a deduction from premises.

In conclusion, let me say that I am fully aware of having only skimmed the surface of a subject capable of being elaborated into the vast depths of physiology and psychology ; but I trust my remarks will be considered as the contribution of a lover of nature rather than a student of science, towards the solution of the question of the reasoning powers of the lower forms of the animal world. I have only to add that what I have said is based, not upon the thoughts or the writings of others, but upon my own personal and individual observation. My object will be accomplished if I have so far interested any one here that he will look with increased attention upon that very wonderful, but very common spectacle, a caterpillar ; or in the words of a well-known writer, learn

“ To watch the workings of instinct, that grosser reason of brutes ;

“ To trace the consummate skill that hath modelled the anatomy of insects ;

“ To learn a use in the beetle, and more than a beauty in the butterfly ;

“ To recognise affections in a moth, and look with admiration on a spider.”

“ Yet thou wert once a worm, a thing that crept
On the bare earth, then wrought a tomb and slept ;
And such is man, soon from his cell of clay,
To burst, a seraph, in the blaze of day.”

BIRDS - OF - WAKEFIELD.

BY W. TALBOT.

[The following six Birds were unfortunately overlooked and omitted from our last issue. They should precede the Black-headed Gull, and the heading should have been *Laridæ* instead of *Alcadæ*.—EDS. NAT.]

ALCADÆ.

RAZORBILL (*Alca torda*)—

Two came into my possession in the spring of 1853, which had recently been shot in the old river at Kirkthorp.

PELECANIDÆ.

CORMORANT (*Phalacrocorax Carbo*)—

One has been shot at Stanley Ferry, and another at Kirkthorp Dam; and four have been seen at Newmillerdam, two of which were shot.

LARIDÆ.

COMMON TERN (*Sterna Hirundo*)—

I have had several immature specimens brought to me which had been shot on the Calder and at Cold Hiendley reservoir.

ARCTIC TERN (*Sterna macroura*)—

Three specimens are in Mr. Firth's collection, two of which he shot at Kirkthorp Dam and one at Horbury.

LESSER TERN (*Sterna minuta*)—

Birds of immature plumage are shot every spring or autumn. At the present time (August 21st) one is on Cold Hiendley reservoir, having been there for several days.

BLACK TERN (*Sterna fissipes*)—

On several occasions I have seen this bird at Cold Hiendley. In 1873 one remained on the reservoir until the 18th of May. Mr. Parkin has one in his collection shot at Kirkthorp.

SCIENTIFIC NOMENCLATURE.

BY PROF. ALFRED NEWTON, F.R.S., F.L.S. &c.

I WAS once very strongly in favour of what I at the time believed to be a much-needed reform of Scientific Nomenclature, but good fortune threw in my way certain objections to the ideal theory of perfection which I, like your correspondent Mr. Bairstow (*Nat. Dec.*, 1876, p. 73), had adopted. To these objections I gave my best attention, and I soon satisfied myself that they were well founded. Being at

the time full of zeal, but young and without experience, I did not perceive, among other things, the essential difference between a name and a definition. However misleading or inapplicable a name may be, it is simply a name, and should never be confounded with a definition. A definition—or, in scientific terms, a diagnosis—must always be exact, or it ceases to be what it professes. I can fully enter into your contributor's feelings, for there was a time when I felt exactly as he feels. But further acquaintance with the subject has made me, I hope, a wiser man. I venture in all humility to suggest for his perusal the discussion of the subject which he may find, if he has access to the volumes, in the "Analyst" of many years ago, and in the "Magazine of Natural History," wherein the late Rev. Hugh Edwin Strickland shewed the incontestable (as it appears to me) superiority of those principles of nomenclature which were afterwards embodied in the code published by the British Association. This code has been often printed, yet I am well aware of the fact that a comparatively small number of the zoologists of the present day are acquainted with it. There are men who have objected to this code, that it is hard to apply. I have yet to see any code that is not so, and I am sure that one founded on Mr. Bairstow's views would, from the beginning, be beset by so many difficulties that it could never be made to work.

Magdalene College, Cambridge,
3rd December, 1876.

SCIENTIFIC NOMENCLATURE.

By H. F. PARSONS, M.D.

YOUR correspondent, Mr. S. D. Bairstow, would find that to alter well established names with the view of reforming Scientific Nomenclature, would cause far more confusion than it would cure. Scientific nomenclature is already overburdened with synonyms; for instance, the common bluebell is, in different books, variously termed *Hyacinthus nonscriptus*, *Agraphis nutans*, *Endymion nutans*, and *Scilla nutans*; nor is bluebell itself free from ambiguity, for the "Bluebells of Scotland" are *Campanula rotundifolia*.

Names are marks set upon objects to distinguish them from others, and the chief requisite of a scientific terminology is that each species should have a single name which should distinguish it from all other species. The Linnæan binary system of nomenclature also indicates

to what other species the one in question is most nearly allied. What the form of these marks should be, is a question rather of convenience than of prime scientific necessity. It is no doubt desirable that scientific names should be short and euphonious, and that they should recall some characteristic feature of the species ; chiefly because such names are more easily learnt and remembered ; but no one would be justified in altering established names merely to this end. "William Shakespeare" is found quite sufficient to identify the individual who bore it, although it in no way describes the characteristics for which he is remarkable.

A set of canons of nomenclature was laid down by Linnæus, but even Linnæus himself did not always adhere to them. For instance, one canon is to the effect that names taken from other languages besides Latin and Greek are inadmissible ; yet, as the specific name of the common brook-lime Linnæus took the not very euphonious Swedish name, "Beccabunga." In fact, in this, as in other matters, it is impossible to lay down a hard and fast line of practice. Rules are sometimes useful guides, but skill and judgment are often better evinced in knowing when to depart from them than in following them. Thus none of the Linnæan canons seems more reasonable than that scientific names should not be given in honour of saints or of persons in authority, but only of naturalists ; yet in the name of a genus of flowers bearing something of a resemblance to a human face, Linnæus has fitly enshrined the beautiful legend of St. Veronica, and what loyal Englishman will dispute the appropriateness of the name of that grandest of plants, the gigantic water-lily "Victoria Regia" of Lindley ? For a name to convey a sufficient description of the species it noted, it would often require to consist of several sentences, rather than of a single word. I should imagine, though I do not speak as an entomologist, that this would be especially the case among butterflies, the distinctions between different species consisting to a great extent in the arrangement of the colours. If so, this would help to explain why unmeaning classical names have been so largely used in this order. That such names are sufficiently distinctive as marks of kinds, is shown by the fact that in exchanges it is found enough to quote the specific name, e.g. "Machaon," "Aglaia," &c. ; this could not be done without confusion with such names as "albus," "vulgaris," &c. Mythological names, though perhaps carried to excess among butterflies, are sometimes appropriate enough—e.g. the little one-eyed crustacean

"cyclops," and the weird, uncanny-looking, prickly New Zealand lizard, "*Moloch horridus*."

One objection to naming animals from the plants that they feed on, is that one species may feed on many plants. I fancy that "*Bombyx quercus*" is oftener found on the bramble than the oak. Names indicating the habitat of the species are very convenient—*e.g.* "*calcarea*," "*maritimum*."

The only objection that I know to commemorating the names of eminent naturalists by naming species after them, is that the said names are often far from euphonious; even "*Smithii*" contains a touch of the comic, but who could wish to immortalise the name of the Russian investigator, Przszinsky ?

“ Phœbus ! what a name
To fill the speaking trump of future fame !”

From a list of botanical genera I pick out at almost at random the following :—*Schwenkfeldia*, *Schweiggera*, *Schweykherta*, *Schycho-wskya*, *Schwægrichenia*, *Schlechtendahlia*, *Schiwereckia*, *Scheuchzeria*. Would any amount of familiarity make those “ rugged names to our like mouths grow sleek ? ”

A distinction often forgotten is, that species to which the name of the author who first described them is given, should bear that name in the genitive case; whereas if a species be named merely in compliment to a person, an adjective ending in “*anus*” should be used: thus, a species described by Sowerby would be “*Sowerbyi*,” if named in compliment to that author it would be “*Sowerbyanus*.”

The genus of foraminifera “*Challengeria*” illustrates a somewhat novel principle of nomenclature; and should Mr. Bairstow be so fortunate as to discover a new species of butterfly at one of our joint meetings, I would suggest that he might adopt another, and call it “*Westridingconsolidatednaturalistsocietyana*.”

Goole, Dec. 7th, 1876.

CIRCULATION OF MS. PAPERS ON NATURAL HISTORY, &c.

Our valued correspondent, Mr. John Jones, of the Tees-side Field Club, has suggested what seems to us a very useful project. It is that, when the authors are willing, papers read before any Society should be forwarded to other Societies in the Union, if desired, for circulation amongst the members, or to be read at their meetings. We think this a very useful and feasible idea, and shall be glad to

hear the opinions of the leading members in all the Societies upon it. For ourselves, we can only say that we shall be glad to be the medium or centre of distribution, and will receive and forward any such papers as required, the Societies in all cases paying the postage both ways. Suggestions as to rules, &c., will be gladly received.—EDS. NAT.

Short Notes and Queries.

RAINFALL AT HUDDERSFIELD.—Rainfall during December, 7·09 in. ; average, 1866 to 1875, 3·25 in. Total fall in 1876, 36·38 in.—average 32·60 in. Rainy days in December, 24—average 17 ; rainy days in 1876 201—average 186. It will be seen from the above that more than twice the average amount of rain fell in December. Up to the end of November the rain during the year had been remarkably near the ten years' average, and the excess of the year's return is owing almost entirely to the floods of December. The heaviest day's rain was on June 23, when 1·58 in. was registered ; the only other case during the year of the fall exceeding 1 in. was October 8, viz., 1·42 in. During the year the direction of the wind has been as follows :—North 6 days, north-east 37 days, east 64 days, south-east 29 days, south 17 days, south-west 66, west 117, north-west 30. On 52 days the thermometer registered 32° or less, and snow fell on 32 days.—J. W. ROBSON.

RAINFALL AT WAKEFIELD—In December rain fell on 23 days, making a total of 5·91 in. The heaviest day's fall occurred on the 2nd, to the depth of 0·79 in.—FREDK. HILL.

RAINFALL IN BARNSLEY DISTRICT.—December.—Barnsley (350 feet above the sea), 6·11 in. ; greatest fall on the 2nd—0·92 in., or nearly one inch. 24 wet days.—Waterworks at Ingbirchworth, on the Moors, (853 feet) 8·76 in., greatest fall Dec. 19th ; 27 wet days,—Stainborough Park, three miles west (600 feet), 7·33 in. ; rain on 18 days, snow on 2 days four inches thick.—T. LISTER.

RAINFALL AT GOOLE.—December.—4·26 in. ; wet days, 25. Greatest falls on 5th, ·61 in. ; on 19th. ·56 in. ; and on 30th, ·52 in.—H. FRANKLIN PARSONS.

GREY PARROT.—Will you kindly inform me if you or any of your correspondents have ever known the grey parrot to lay eggs in the winter months to the amount of 14, and then to expire after depositing the last egg ? We have had one which we presume to have been about five years old, which has laid this number during the last three winter seasons, and died at the end of the third.—I am, &c., WILLIAM BROWN.

Alcedo ispida NEAR HUDDERSFIELD.—A fine specimen of this rare bird, with us, was shot on 3rd January by Mr. Riches, on the stream between Kirkheaton Church and Sheard's Dam.—ABRAHAM SHEARD.

Reports of Societies.

BRADFORD NATURALISTS' SOCIETY.—Annual Meeting, Dec. 19th, Mr. E. Margerison, president, in the chair. The business of the meeting was to elect officers for the ensuing year. The report of the past year was read, which showed an increase of ten members.

MEETING January 9th, Mr. Firth, president, in the chair.—After the usual business of the meeting had been disposed of, the president made a few remarks, urging all members to commence the coming season by taking notes of the arrival of migratory birds, flowering of plants, &c.—H. T. Soppit, Cor. Sec.

GOOLE SCIENTIFIC SOCIETY.—At the last meeting a paper was read by Major Best on "Crookes' Radiometer and its Teachings," Mr. E. Hunter, the president of the Society, in the chair. The paper was illustrated by experiments of a very interesting character. The actions of all the descriptions of radiometers agree in this, that they show differing degrees of action under the several rays of the spectrum, but that none are without effect.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting Jan. 12th, the president, Mr. C. P. Hobkirk, in the chair. The exhibitions included the following mosses by the president:—*Eurynchium striatum*, *Dicranum palustre*, *Hypnum Schreberi*, *Leucobryum glaucum*, and *Polytrichum piliferum*—all collected by Mr. George Brook at Sherwood Forest, in April last. The president also shewed *Wahlenbergia hederacea* from Thurstonland. Mr. John Conacher shewed the following conchological specimens:—*Helix ericorum*, *H. virgata*, *H. nemoralis*, *H. caperata*, and *H. hispida*, from Malton; *Sphaerium corneum* and *Bithynia tentaculata*, from Glasgow; *Limnaea auricularia* from Edinburgh; *Bithynia Leachii* from Askern; *Sphaerium rivicola* from Elland (now extinct there); *Planorbis alba* from Luddenden Foot; *Valvata piscinalis* from Crieff; and *Cochlicopa tridens* from Bretton Park. Mr. G. T. Porritt shewed various lepidoptera, including *Notodonta chaonia* and *Eudorea atomalis*, the latter from Rannoch; also preserved larvæ of *Acidalia inornata*, *A. incanaria*, *Rumia crataegata*, *Botys acinalis*, *Spilodes palealis* (?), *Pionea forficalis*, *Arctia lubricipeda* and *Mamestra brassicea*. The secretary, Mr. George Brook, read extracts from a paper by Mr. J. Huddart, in the current number of the "Journal of Science," entitled "Evolution by Expansion versus Evolution by Natural Selection," which elicited some discussion, most of the members considering the argument as an "expansion" of the Darwinian theory, rather than antagonistic to it.—G. B.

LEEDS GEOLOGICAL ASSOCIATION.—Meeting January 9th, at the College of Science, Cookridge-street. The president (Professor A. H. Green, M.A., F.G.S.) delivered a lecture on "Recent Views on the formation of Crystalline Rocks." The lecturer said that probably all crystalline rocks are altered non-crystalline or derivative rocks; and in support of this

view he adduced numerous instances where the rocks of a district merged imperceptibly from a soft clayey slate, through various stages of crystalline development, into mica-schists and granite. The varying susceptibilities of different rocks to the metamorphosing force was also referred to. The lecture was illustrated by several sections and a large number of valuable mineral specimens.

NOTTINGHAM WORKING MEN'S NATURALISTS' SOCIETY.—Annual dinner, 16th January.—The room was tastefully decorated, very many superb insects being exhibited, some of them of a rare character, notably the following :—*Orichalcea*, *Albimacula*, *Parthenias*, *Conspicillaris*, *Apiformis*, *Nerii*, and *Galii*, and some goods pecimens of butterflies were also shown. A case of geological specimens exhibited by the president (Mr. W. Rigby) attracted much attention. Some admirable cases of birds, &c., were exhibited by Mr. T. B. White and others. After dinner the chair was taken by Mr. Councillor Walter Gregory, and the vice-chair by Dr. Varley. The secretary, Mr. William Wright, presented the annual statement of the affairs of the Society, which appeared to be in a most prosperous condition. After the purchase of numerous standard works of reference, and many valuable specimens of natural history, together with cabinets, &c., there was a satisfactory balance remaining in the hands of the treasurer.—W. Wright, Secretary.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting, Mr. R. Earnshaw, vice-president, in the chair. A few geological specimens were exhibited, amongst them being a very good *Sigillaria*, by Mr. T. Smith. Mr. T. Hirst named and exhibited a number of British birds, including two pairs of pheasants, two pairs of short-eared owls, one pair of screech owls, a tawny owl, one pair of kestrel hawks, and one pair of merlin hawks. Mr. Henry Bradlaugh, of Beggerington, presented a copy of the latest edition of “Dr. Livingstone's Travels and Explorations in Central Africa.”—J. OGDEN, secretary.

SELBY NATURALISTS' SOCIETY.—Annual Soiree, 5th January.—The proceedings consisted of an exhibition divided into four sections. The first section consisted of specimens collected by members during the past year, supplemented by loans from non-members, and comprised dried plants and ferns, fossils, butterflies and moths, stuffed birds and animals, birds' eggs, &c. Scientific apparatus formed the next section, under the charge of Dr. Parsons. Here were several microscopes, the property of members of the Goole and Selby Societies; a photometer, radiometer, and Luccato's papyrograph (at work). The third section contained a small but choice collection of antiquities, chiefly by Selby collectors. Amongst other objects was exhibited a coffin containing a skeleton, found recently with several others, in excavations at Selby. There is reason to suppose that it is of Saxon date. The fourth section consisted of the industrial products of the town, in which were shown specimens of the various trades of the district. The chair was taken by the president, Mr. J. T.

Atkinson, F.G.S. Mr. Jefferson, F.C.S., of Leeds, performed several interesting chemical experiments.

SHEFFIELD NATURALISTS' CLUB.—Annual Soiree, January 12th, in the Cutlers' Hall. A lecture was delivered by Mr. R. Bowdler Sharpe, M.A., of the British Museum, on "Birds of Prey, and their geographical distribution." The specimens exhibited were far in advance of those displayed at any previous exhibition of this Club. Amongst the microscopes Mr. H. C. Sorby, F.R.S., exhibited a *fac-simile* of the first microscope ever constructed, which was made in 1590 by a spectacle maker of Middlesburgh, in Holland. It is a plain unmounted barrel, looking like a relic of the dark ages, and the glasses, as compared with recent inventions, are wonderfully inefficient. Side by side with this ancient instrument was one of the most recent construction, by means of which Mr. Sorby showed the beauties of geological and other sections. The most important item amongst these was the hair of a sloth made green by the growth of microscopic plants. The colour is imparted to the hairs by means of a confervoid plant which grows on them in the damp woods of South America. Mr. H. P. Harris, of Rotherham, contributed samples exhibiting the propagation and mode of growth of some of the lower organisms—ferments, bacteria, &c. Mr. F. Brittain contributed a large number of plants, assorted and typical of the various genera; amongst them were grasses from distant countries, rare ferns, lycopodia, flowering plants, and a number of insect-catching plants. The latter were a very fine collection.

WAKEFIELD NATURALISTS' SOCIETY.—Annual meeting, Mr. G. Campbell, V.P., in the chair.—Mr. Hall exhibited a golden-crested wren (male), caught at Methley. The officers were elected for the ensuing year, J. Wainwright, F.L.S., being president, and J. Spurling, hon. secretary.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting, Jan. 10th, Mr. C. D. Wolstenholme in the chair.—It was proposed and carried that a dinner be held on Wednesday, Feb. 7th, for members and friends of this Society. Mr. Ripley exhibited a very fine specimen of the rough-legged buzzard (*Falco lagopus*), sent by Mr. Edson, of Malton, which was taken in a trap at Langton Wold; also two grand specimens of the great grey shrike (*Lanius excubitor*), one shot near York, the other near Church Fenton, also eggs of the latter; Mr. C. D. Wolstenholme, egg of the great northern diver (*Colymbus glacialis*); Mr. Helstrip, a specimen of the common buzzard (*Falco buteo*) in the flesh, caught in a trap with a wood pigeon near York; also a musical instrument used by the snake-charmers of India: Mr. White, a magnificent specimen of the hawfinch (*Fringilla coccothraustes*), shot on Knavesmire; Mr. G. C. Dennis a box of fine *Tortrices*; Mr. Robinson, a series of bred *Cidaria psittacata*; the secretary, a fine specimen of *Plusia orichalcea*.—W.M. PREST. Hon. Sec.

Diary.—Meetings of Societies.

- Feb. 1. Huddersfield Literary and Scientific Society (Botanical Section)—Paper: "The plan on which plants are built."—Wm. Spottiswoode Cameron, M.D., B.Sc. Linnean Society of London.
- ,, 6. Leeds Naturalists' Club, &c. Bishop Auckland Naturalists'.
- ,, 9. Huddersfield Scientific Club—Paper: "Locusts in Yorkshire."—Mr. W. Denison Roebuck, of Leeds. York and District Naturalists' Field Club—Annual Soiree: The Rt. Hon. the Lord Mayor, chairman.
- , 10. Huddersfield Naturalists'.
- , 12. Huddersfield Literary and Scientific Society—Paper: "The triumphs of Scientific Research as exemplified in the history of Astronomical Discovery."—Mr. C. P. Hobkirk.
- , 13. Leeds Naturalists' Club and Scientific Association—Paper: "The Scientific Bases of physiognomy."—Mr. F. Curzon.
- , 14. York and District Naturalists' Field Club.
- , 15. Huddersfield Literary and Scientific Society (Botanical Section)—Paper: The relations of Animals and Plants."—Mr. C. P. Hobkirk. Linnean Society of London.
- , 20. Leeds Naturalists' Club and Scientific Association.
- , 22. North Staffordshire Naturalists', &c.—Meeting at Newcastle.
- , 26. Huddersfield Naturalists'.
- , 27. Leeds Naturalists' Club, &c.—Annual Meeting.

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MARCH, 1877.

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NOTES ON MR. PORRITT'S PAPER ON THE BRITISH PYRALES.

By F. BUCHANAN WHITE, M.D., F.L.S.

WILL you permit me to make a few remarks upon this paper, which I have read with much interest?

Herbula cespitalis. As Mr. Porritt remarks, this is a true day insect, yet I have taken it at night. Last summer, one evening a specimen flew into the light accompanied by *Pempelia subornatella*. The nearest locality for the latter is quite two miles away, and for the former nearly as far—in both cases, of course, as far as my knowledge goes. I have some recollection of having seen *Herbula* at light on other occasions.

Ennychia cingulalis. The larva of this must have other food plants than *Salvia pratensis*, as it occurs very many miles from any *Salvia*. *Teucrium scorodonia* is a likely plant, but if it feeds on *Labiates*, I believe common thyme is as likely as any. *Herbula* too may feed on *Salvia* and *Plantago*, but it is often found where there is neither. With us it usually frequents grassy places on the hills, often high up.

Pyrausta purpuralis and *ostrialis* also often occur where there is no *Mentha* of any kind.

Scopula lutealis. I have been more fortunate than Mr. Porritt, for I have seen the larva of this species. I noticed that a plant of the melancholy thistle (*Carduus heterophyllus*) had been eaten by some larva, and, on examining it, found several small green tortrix-like caterpillars, in webs on the underside of the leaves. From these I reared several specimens of *lutealis*. *Lutealis* frequently occurs where there is neither coltsfoot nor melancholy thistle, so it probably affects other *Compositæ* as well.

Scopula alpinalis is not a British species. The insect known by this name is *uliginosalis* Steph., and appears to be sufficiently distinct from the true *alpinalis* which the late Mr. Doubleday sent me. Ragwort may sometimes be the food-plant, but not often, unless the larva lives at a very different altitude from the perfect insect. *Uliginosalis* is usually found at a very high altitude, but in Braemar, where it is common, I have found it flying in woods as low as 1200 feet, where it may indulge its fancy for ragwort if it pleases.

Eudoreia basistrigalis. When once known this is a readily recognised species when pinned and set. In the field it might readily be passed over as *ambigualis*. I think there is some mistake about the statement that it is common in Rannoch, though it certainly is a Perthshire species. *Eudoreia atomalis* is common enough in Scotland, but I am not sure that it is more than a variety of *Ambigualis*. It has also been reported from Witherslack, and probably occurs elsewhere in North England. *E. alpinalis* is with us a local species, and so specially alpine that I should very much like to see English (and especially fen) specimens, and if anyone will kindly let me have a sight of such I shall be much obliged, and will return them with all care. *E. coarctalis* is the only species that hibernates, as far as I know. I have taken it in April. The larvæ of *E. muralis* may be found till June on the hills in various mosses (*Racomitrium*, &c.) on stones. The larvæ of *truncicolaris* I have found feeding on *Hypnum cupressiforme* on stones. The larvæ of *ambigualis* and *atomalis* I could never find even where the imagos were abundant shortly afterwards.

Perth, January 15th, 1877.

NOTES ON BIRDS FOR THE AUTUMN MONTHS, AT BARNSLEY.

BY THOMAS LISTER.

SUMMER BIRDS MOVING TO SOUTHERN COUNTRIES.

Sept. 25.—*Crex pratensis*, the land-rail or corn-crake—last recorded.

Oct. 6.—*Hirundo riparia*, sand martin.

„ 9.—*Cuculus canorus*, the cuckoo—last seen, a late date.

„ 14.—*Hirunda urbica*, the martin. At Ingbirchworth reservoir, on the western moors.

Oct. 24.—*Hirundo rustica*, swallow, at Cawthorne, four miles north-west of Barnsley. It is singular that the latest dates recorded for both swallow and martin are on or near the moors.

Oct. 25.—*Caprimulgus Europæus*, goat sucker, last case recorded; occurred at the Aqueduct, and fortunately it migrated before the gun could do its deadly work.

AUTUMN AND WINTER VISITANTS.

Sept. 14.—*Anser ferus*, gray lag or wild goose. A flock of thirty flew over the Dearne at Old Mill, in a south-west direction, and on Dec. 12th fifty flew over Darfield southward.

Sept. 14.—*Anas boschas*, wild duck. Immense flocks noted flying south and south-west.

Sept. 15.—*Corvus Cornix*, hooded crow. Early for this migrant from Norway.

Oct. 16.—*Scolopax rusticola*, woodcock. Seen by J. Jagger, keeper, Worsborough.

Oct. 21.—*Motacilla sulphurea*, grey or grey-and-yellow wagtail, at Taylor's warm ponds in the town ; also in Dearne valley.

Oct. 26.—*Turdus pilaris*, fieldfare. A flock, estimated at 2000, near Tickhill, flitting over the stubble-fields—the earliest date we have to record this year.

Nov. 6.—*Turdus iliacus*, redwing. First seen by me on the fields and trees near Old Town.

Nov. 15.—*Fuligula clangula*, golden eye. Seventy seen on Dunford reservoir, on the moors, by Mr. C. Wemyss.

The above are the chief regular migrants from north to south noted or recorded to me. Of the partial migrants, the rarer resident birds, and occasional visitants, we note the following :—

Sept. 24.—*Buteo vulgaris*, the buzzard, shot on the moors beyond Penistone : in the possession of Mr. G. Horne.

Oct. 16.—*Regulus cristatus*, golden-crested regulus, reported to me by the Rev. J. Mason, at Pindar Oaks.

Oct. 24.—*Scolopax major*, great snipe. Three noted in the Dearne valley, with the common snipe. It is rare ; I had one brought from same part a dozen years back. A few reported since.

Oct. 24.—*Totanus hypoleucus*, common sandpiper, same place. It breeds by the moorland streams.

Nov. 15.—*Ardea cinerea*, the heron. Five noted by Mr. C. Wemyss at Cannon Hall.

Nov. 18.—*Buteo vulgaris*, a second buzzard this autumn. It was 4ft. 3in. in extent of wings, and about 2ft. from back to tail.

Dec. 27.—*Scolopax major*, great snipe. Shot in the town of Barnsley, an unprecedented occurrence.

Dec. 28.—*Botaurus stellaris*, bittern. A fine male procured from Worsborough Park, three miles south of Barnsley.

Nightingale. A nest was found by Mr Z. Schofield at Warren, making the fourth pair of these birds breeding in this district.

Barnsley, December, 1876,

MACRO-LEPIDOPTERA AT SHERWOOD FOREST.

By S. L. MOSLEY.

WHEN a naturalist is about to visit a locality new to him, it is always a desideratum to obtain some knowledge of its probable productions ; alas ! naturalists (?) are sometimes very loath to give such information to a brother seeking it, or, if the information be given, the particular habitat of some "good thing" is held back, hidden in an avaricious and selfish breast. The withholding of such information may in some cases be right and justifiable, as, for instance, in the case of a person I could name, who, "from information received," went to a certain place, and after gathering all the buff-tip larvæ he wanted for himself, cut down all the branches he could see with any more larvæ on them, and threw them into the river !

I do not want to moralise on such proceedings : what I wish to say is, that when a naturalist visits a locality, if he would publish the results of his visit, it would be a finger-post to others following in his steps, and he need not be afraid of them coming to the hands of such a person as the one I have mentioned.

I first visited Sherwood Forest in August, 1872, for the purpose of collecting *Euperia fulvago*, Mr. Porritt being the guide to the small party of which I was one. Since then, my frequent visits have made me pretty familiar with the place—in fact going there seems almost like going home. I am sorry to say that the keepers are doing all they can to stop collecting, especially "sugaring," which bait is the entomologist's chief weapon at Sherwood ; but I have no doubt Earl Manvers would give permission to any person who would apply in a proper manner. The entomologist will have no difficulty in distinguishing the main sugaring drives, as the trees bear conspicuous black patches by the constant application of this mixture to their trunks.

It must be understood that the following list includes only those species I have taken myself, or which I know have been taken, without reference at all to other lists published some time ago :—

Pieris brassicæ, rapæ, and napi—common, of course.

Gonepteryx rhamni. I have taken a single specimen.

Argynnис Adippe. Two specimens, both much worn.

Vanessa urticæ. Common.

V. polychloros. One by Mr. Bairstow, 1873.

Vanessa Antiopa. Several have been taken.

V. Atalanta. Not uncommon.

Satyrus Megœra. One worn specimen near Budby.

Chortobius Pamphilus. Abundant.

Thecla quercus. Larvæ not uncommon on oaks, chiefly in the broad drive which leads from the "major."

Polyommatus phlæas. Abundant; the white variety has occurred, and I have a curious dark one I took there in 1873.

Lycœna Alexis. Near Budby. *Argiolus* ought to occur, there are plenty of hollies.

Acherontia Atropos. The larva is frequently found in the potato fields.

Chærocampa porcellus. I have taken one at sugar.

Hepialus velleda. Not rare.

Nola cucullatella. Larvæ common on the hawthorn bushes.

Euchelia jacobeæ. Common.

Chelonia caja. I have frequently found the larvæ.

Liparis auriflua. Larvæ a nuisance on all the hedges.

Orgyia pudibunda. Larvæ by beating oak and birch.

O. antiqua. I have taken a few.

Pæcilocampa populi. Mr. Porritt has taken the larva.

Bombyx quercus, var. callunæ. On heath and bramble.

B. rubi. Larvæ swarm on the open grassy space below the "major."

Eurymene dolabraria. A single specimen bred from larvæ taken in 1872.

Selenia illunaria. Common.

Ennomos erosaria. One specimen on the "major."

Phigalia pilosaria. Not common.

Amphydasis betularia. Common.

Tephrosia punctulata. One.

Iodes lactearia. A few.

Phorodesma bajularia. One bred.

Ephyra omicronaria and *pendularia*.—A few bred.

Cabera pusaria. Common.

Panagra petraria. Common.

Fidonia atomaria common; and *piniaria* common in a wood near Worksop, on the Edwinstowe road.

Abraxas grossulariata. Common.

Hybernia rupicapraria, abundant; *leucophæria*, sparingly; *aurantiaria* common; *defoliaria*, a few.

Cheimatobia brumata and *boreata*. Very common.

Oporabia dilutata. A few.

Larentia pectinitaria. Pretty common.

Eupithecia castigata and *minutata*, common; *centaureata* and *rectangulata*, one each.

Melanthia ocellata. Common.

Coremia unidentaria. One.

Scotosia dubitata. One.

Cidaria testata. Common on the heath.

Platypteryx falcula. Not rare.

Cilix spinula. do.

Stauropus fagi. A few have been taken by different individuals.

Pygæra bucephala. Larvæ by beating oak.

Notodontia camelina. do.

N. dodonæa. Larvæ taken on the "major."

Diloba cæruleocephala. Larvæ pretty plentiful on oak and thorn.

Cymatophora diluta. Common at sugar.

Acronycta psi. Common; I have taken the larvæ of *tridens* once on a plum tree, where there were a lot of *psi*.

Chæreas graminis. Common on the ragwort flowers.

Cerigo cytherea. Not uncommon at sugar.

Luperina testacea and *cespitis*. Not unfrequent.

Agrotis suffusa. Occasionally.

Tryphæna janthina and *fimbria*. Occasionally.

Noctua glareosa. Very common on the ling flowers; *C.-nigrum*, occasionally; *Dahlii*, occasionally; *neglecta*, two in 1872 and one in 1876—all the red form.

Orthosia macilenta. Common.

Anchocelis rufina. Very common; *pistacina* and *litura* not so common.

Cerastis spadicea common. *Vaccinii* of every shade.

Xanthia ferruginea. A few.

Euperia fulvago. This is the speciality of Sherwood. In 1872 over one thousand specimens were taken by four individuals. I have never found it so common since.

Epunda nigra. One.

Miselia oxyacanthæ. Common, a few of the dark variety.

Agriopsis aprilina. Pupæ by digging at oaks.

Aplecta occulta. — One.

Hadena protea, common; *pisi*, not unfrequent; *contigua*, once.

Heliothis dipsacea. This has been taken once.

Anarta myrtilli. Larvæ common on ling.

Gonoptera libatrix. Taken once or twice.

Amphipyra pyramidea, swarms; *tragopogonis*, common.

Stilbia anomala. Occasionally, at ragwort flowers.

Euclidia glyphica. Once. &c.

Almondbury Bank, Huddersfield, December, 1876.

[Judging from the above list, we think Mr. Mosley has "missed" a good many species he certainly ought to have come across at Sherwood. The following, which he entirely omits, we have taken commonly there, some indeed very plentifully: *Arctia fuliginosa*, *Ephyra punctaria*, *Eupithecia nanata* and *exiguata*, *Acronycta leporina*, *Himera pennaria*, *Tephrosia biundularia*, *Tæniocampa cruda* and *miniosa*, &c. The following we found less commonly, but still of not unfrequent occurrence;— *Thera variata*, *Nyssia hispidaria*, *Amphydasis prodromaria*, *Notodonta dromedarius*, *Cymatophora flavigornis*, *Heliothobus popularis*, &c.; also the following, but less numerously:—*Aspilates strigillaria*, *Ennomos tiliaria*, *Eupithæcia pulchellata*, *Cidaria corylata*, *Eubolia palumbaria*, *Neuria saponariæ*, *Coremia ferrugata*, *Aglossa pinguinalis*, *Herminia barbalis*, *Vanessa Io*, and *cardui*, &c., &c. *Orgyia antiqua* is common, contrary to Mr. Mosley's experience; we also got the grey form of *Noctua neglecta*. *Eurymene dolabraria* and *Phigalia pilosaria* are pretty common; whilst the larvæ of *Ephyra pendularia* are very plentiful amongst the birches. On the other hand we never noticed either *Phorodesma bajularia* or *Ephyra omicronaria* at Sherwood, and shall be very pleased to see Mr. Mosley's specimens, as we believe the species have never before been recorded from the locality. We have no recollection of noticing even the food of *omicronaria* at Sherwood.—G. T. P.]

REPORT ON THE GEOLOGICAL OBSERVATIONS OF THE TEES VALLEY FIELD CLUB FOR 1876:

By JOHN JONES, F.G.S.

In the neighbourhood of Ayton the members of the above Club have had an opportunity of inspecting several exceedingly interesting exposures of what is known as the Whin Dyke of Cleveland. The main points raised for discussion were with reference to the age

and origin of this remarkable outburst of igneous rock, which extends in nearly a straight line from the neighbourhood of Middleton, in Teesdale, to a short distance south-west of Whitby. It is assumed by some eminent geologists that the Dyke is associated with what is known as the Whin Sill, and which has its maximum development in the vicinity of High Force and Cauldron Snout, as an interbedded igneous rock, agreeing in general lithological characteristics with the stone of the Dyke, but differing from it essentially in its relation to the stratified deposits. In the case of the Whin Sill, the igneous rock occurs as a layer obtruded between the members of the upper carboniferous series (the Yoredale rocks of Phillips). The Dyke, however, cuts through the superincumbent strata vertically, and, during its course, penetrates stratified deposits from the carboniferous to the oolitic age. I am disposed to agree with those geologists who regard the Whin Dyke as quite distinct in its origin from the Whin Sill. It has now been conclusively demonstrated that even so late as the miocene period, which represents a comparatively recent geological epoch, the north-western portion of Great Britain was the theatre of most active volcanic phenomena, when in the Island of Mull, and in other parts of the Hebrides, all classes of igneous rocks, from granite to the representatives of the most modern volcanic minerals, were poured out in vast abundance. It would seem, then, more rational to connect the Whin Dyke with this latter period of local volcanic activity than with the infinitely older carboniferous era. Geologists now know that the age of any particular igneous rock is not to be deduced from its mineralogical or lithological composition, as the various forms of highly crystalline to compact varieties are merely due to the conditions under which the cooling process has taken place—the granites and basalts of the tertiary period being lithologically undistinguishable from those associated with the oldest sedimentary deposits. The Whin Dyke appears to have altered the rocks through which it penetrated, only a short distance on each side. But after all is said, the remarkable fact remains that we have here the occurrence of a mass of igneous rock that strikes across half-a-dozen formations in what is virtually a straight line, and which varies only to a slight extent throughout its whole course, either in dimensions or in mineralogical composition. The amount of disturbance that this outburst has exercised on the strata penetrated is remarkably slight.—At the meeting at Forcett, the members had an opportunity of inspecting a surface of mountain limestone, shewing, in a most unmistakeable manner, striæ and markings due to the movement of ice during the glacial period. Specimens of Shap Fell granite were also found *in situ*. There is no doubt that during the glacial epoch there was an ice flow over Stainmoor, which branched off in various directions. The ice that has marked the Forcett limestone appears to have been moving in a south-easterly direction, as all the striæ tend that way. The limestone workings at Merrybent were also visited, but considerable doubts were expressed

as to whether the latter limestone is an equivalent of the beds that are worked at Forcett. The opinion seemed rather to lean to the view that the Merrybent limestone is a lower member of the Yoredale series, than the one represented by the Main limestone.—In the neighbourhood of High Force the geologists had many opportunities of becoming acquainted with the characteristic features of the Whin Sill ; but as the geological connections of this bed have been already pointed out, it is not necessary to enlarge upon this point. There are, however, many interesting minor features to be observed in the district—such as small veins and dykes, several of which yield mineral specimens of considerable value and interest.

There was nothing specially noticeable from a geological point of view in connection with the Glaisdale meeting. The exposure of the Whin Dyke in nearly its eastern limit was observed, and several good sections of the ironstone strata were seen. In this part of Cleveland the Main seam is broken up into two layers, separated by a considerable thickness of shale, but the measures are worked at some considerable distance from the surface, and do not contain a very high percentage of iron. In the visit to Greta Dale the most striking features of the Yoredale series of the carboniferous system were presented to view. These have been so well laid down by Phillips that scarcely anything remains to be said as to general classification ; but it is evident that even over limited areas the character of the limestone is subject to considerable variations, which modify its value in a commercial sense.—The last meeting of the season was held at Saltburn, in October, and was chiefly devoted to the geology of the ironstone series. The measures succeeding the Main seam of ironstone were traced out from Hob Hill down to Saltburn. It is proposed to wind up the field days each year by holding a meeting at Saltburn.—

Rainfall for January.

HUDDERSFIELD.—January has proved a very wild, wet month, 4·89 in. of rain having been collected in 25 days, against an eleven years' average of 3·11 in. in 18 days. The heaviest day's fall was on the 3rd, when 1·76 inches were registered, having fallen in the form of soft heavy snow. 1·08 in. were also measured on the 29th.—J. W. ROBSON, Dalton, February 19th, 1877.

WAKEFIELD — The number of rainy days has been 23, rain having fallen to the depth of 3·64 in. The heaviest day's fall occurred on the 3rd, when the gauge yielded 1·06 in. — FREDK. HILL, Kirkgate, 19th Feb.

BARNSLEY (350 ft. above sea).—Total fall, 3·82 in. ; heaviest day's fall Jan. 3rd, 1·29 ; 24 wet days.—Stainborough Hall or Wentworth Castle, three miles W by S (600 feet) : Total fall 4·72 in. ; heaviest day Jan. 30, ·78 in ; 16 wet days.—Corporation Works, Ingbirchworth, 10 miles W (153 feet) : Total fall 5·62 in. ; heaviest day Jan. 29th, 1·36 in. : 26 wet

days. There were about as many days of rain, with slight falls of snow, as in December, but less in total rainfall by 2·63 inches in town and country ; sharp nights of frost, frequent mists and strong gales, chiefly from W, SW, and NW, occasionally from N and NE.

LEEDS.—Total rainfall, 3·760 in. ; heaviest falls on 3rd—1·140 in., 29th—.790 in. There were 19 wet days during the month ; in January, 1876, we had only 7 wet days, with a rainfall of .605 in., but more snow. The heaviest rainfall in 1876 was on Oct. 8th, when 1·360 in. of rain fell.
H. CROWTHER, Philosophical Hall, Leeds.

GOOLE.—Total fall, 2·10 inches ; wet days, 22.—H. F. PARSONS.

Reports of Societies.

BARNSLEY NATURALISTS' SOCIETY.—Annual meeting, Feb. 5th.—The accounts were read by J. Harrison, showing a balance in hand. The officers were re-appointed, except W. J. Cope, who resigned in favour of A. Kell, C.E. A paper was read by the president, "Observations of Birds in the autumn and winter months," which were richer than usual in large and rare species—as the common buzzard, rough-legged buzzard, two common bitterns, two great snipes, pochards, scaups, and wigeons.—
T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting Jan. 23rd, the president, Mr. John Firth, in the chair. The evening was devoted to conversation and the exhibition of specimens. Mr. Robert Spencer exhibited good specimens of the brown owl and dipper.

MEETING Feb. 6th, the president in the chair.—Mr. J. W. Carter read an interesting paper on entomology. *Phigalia pilosaria*, *Hybernia leucophearia*, *Teniacampa instabilis*, bred, and the pupa of *S. convolvuli* were exhibited. Mr. Robert Spencer exhibited a fine specimen of the American prairie bird.—H. T. SOPPITT, Cor. Sec.

BRADFORD SCIENTIFIC ASSOCIATION.—Meeting Jan. 11th, Mr. H. Dibb in the chair. A lecture was delivered by Mr. Thomas Tate, vice-president, his subject being "What is life?" The lecturer described and illustrated by diagrams the life history of such minute organisms as the yeast plant, *Torula Cerevisia*, and the free swimming fresh-water plant, *Protococcus pluvialis*. Of these vegetable forms the outer envelope consists of cellulose, which is composed of the chemical elements, carbon, hydrogen, and oxygen : while the inner portion consists of protoplasm, composed of the same chemical elements as cellulose, with the important addition of nitrogen. All plant cells obtain their food by osmosis, the substances on which they feed being in solution in the liquid in which the organism lives, and is drawn or sucked through the outer cellulose envelope. A description was then given of the specks of jelly-like protoplasm found creeping in stagnant waters—the *Amœba*. In this there is no cellulose envelope, and food is not obtained by osmosis, as in

vegetable forms, but solid matter is seized and drawn into the substance of the organism at any part of its surface, the insoluble portions being pushed to the surface and thrown off in the same way. These organisms consist of a single cell, and are reproduced by self-division. Attention was then called to the multicellular green hydra, *Hydra viridis* and *Nitella*, and to the complex mechanism of the water-flea, *Daphnia pulex*. In the course of his remarks the speaker called attention to three fundamental properties of living things—first, that every living thing exists as a single cell or as a multiple of cells, the product by self-division of the primal cell ; secondly, that every living thing grows by the absorption and assimilation of external elements : and thirdly, that these processes of growth, and cell-formation by assimilation, are the work of the natural force or energy which we call life, and this life is the property alone of a mechanical mixture of definite chemical compounds, called protoplasm, which constitutes the physical basis of life alike in plant and animal, and indeed is the only living substance. The lecture was enriched by illustrations consisting of diagrams, coloured drawings, besides which a number of living organisms (described in the lecture) were exhibited under the microscope.—On Thursday evening, January 18th, a paper was read by Mr. J. A. Douglas, hon. secretary, on the common house-fly, in which he described the life history, metamorphoses, anatomy, &c., of this and some other species of dipterous insects ; a number of preserved specimens showing the insects in their various stages being exhibited in illustration. A considerable amount of discussion followed the reading of the paper.—J. A. D.

BURY NATURAL HISTORY SOCIETY.—Monthly meeting in the Athenæum, the president, Mr. R. H. Alcock, F.L.S., in the chair.—After some business of a formal nature was transacted, specimens of the Brazilian lianas were exhibited by Mr. Alcock, a variety of fossils, *Trigonocarpum* and *Sigillaria* from the neighbourhood of Bury, *Belemnites*, *Encrinites*, and many others from the mountain limestone of Clitheroe by Messrs. Wilson, Howarth, and Curtis ; a collection of silk moths and the various stages of silk manufacture by Mr. R. Kay ; and a pair of beautiful specimens of the death's head moth, *Acherontia Atropos*, bred from larvæ taken near Blackpool, by Mr. Jackson. The secretary then read a paper entitled “ Primitive Man.”

GOOLE SCIENTIFIC SOCIETY.—Meeting Jan. 31st.—A paper was read by the Rev. W. Fowler, M.A., of Liversedge, on “ Spontaneous Generation.” The question to which the author addressed himself was, “ How is it that in putrefying animal and vegetable solutions, minute forms of animal and vegetable life make their appearance ? Are they the products of putrefaction, or the products of other animals and plants which have gone before them ? Are they spontaneously generated, or are they developments of living germs ?”—After reviewing the well-known experiments of Pasteur, Bastian, Tyndall, and others, and showing that if

external germs were carefully excluded from the operations, no life was produced, he concluded that the answer to the question propounded was :—"The minute forms of life which make their appearance in decaying organic solutions are the developments of spores and ova which have been carried by the air, or have been contained in the solution : they are not the result of decay or putrefaction, or fermentation, but are the descendants of others that have gone before them." An animated discussion followed.—H. FRANKLIN PARSONS, M.D., Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting Feb. 9th, in the Museum, South Street, Mr. G. T. Porritt, F.L.S., in the chair.—The following periodicals were promised monthly or quarterly as they appear :—By Mr. S. D. Bairstow, "Zoologist," "Entomologist," "Entomologists' Monthly Magazine," and "Popular Science Review;" by Messrs. C. P. Hobkirk and G. T. Porritt, "Science Gossip" "Quarterly Journal of Conchology," and "Naturalist;" by Mr. George Brooke, ter., "Nature;" Mr. Bairstow also presented "Clarke's Objects of the Microscope" to the library. The exhibitions included the following conchological specimens by Mr. John Conacher :—*Vitrina pellucida*, *Physa fontinalis*, and *Planorbis nitidus* from Elland Wood, and *Limnaea peregra* from seven different localities. Mr. Bairstow showed *Bulinus acutus* from Llandudno. In entomology Mr. Porritt showed a series of *Epeorus elutella*, bred and sent to him by Mr. J. R. Wellman, of London. Mr. Bairstow, a specimen of *Phigalia pilosaria* taken at Grimescar on the 31st of January last. Mr. W. D. Roebuck, *Metopius dentatus*, an ichneumonidous parasite from the larva of *Bombyx calluna*; he also showed a remarkable mounted specimen of an insect taken near Leeds, and sent for exhibition by Mr. James Abbott. None of the members could say anything about it. A most interesting paper on "Yorkshire Locusts" was then read by Mr. W. Denison Roebuck, of Leeds,* which was most clearly illustrated by means of coloured maps showing the localities and distribution of the captured specimens (nearly, if not quite all of which appeared to be the species known as *Pachytylus cinerascens*) in Britain. A discussion on the paper ensued, most members believing that locusts have never bred in Britain, contrary to the opinion of Baron de Seleys Longchamps and others.—G. B.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting January 29th, the president, Mr. Joseph Tindall, in the chair. Mr. L. Peace named a case of fine specimens of *Helix aspersa*, exhibited by Mr. Joseph Whitwam; the case contained, besides the above, the following :—*H. albofasciata*, *H. exalbida*, *H. conoidea*, and *H. tenuis*. The president read a very interesting letter from a member at present residing in Florence, named J. E. Zilliken, dated Jan. 11th, 1877, in which he stated that his friend Dr. Forsyth Mayor had discovered one of the missing links in the long chain of Paleontological evolution, which, so far as he knew, had not been

* We purpose publishing this paper in full in our next issue.—EDS. NAT.

published in England yet. The link in question completes the series between *Hipparrison* and *Equus caballus*. Mr. Zilliken says that his friend Dr. Mayor, after despairing of finding any other part of the skeletons of the horses, succeeded at last in discovering several bones of the tarsus and carpus of these fossil animals, as well as various jaws. Close investigation of the carpus and tarsus showed them to be intermediate between the *Equus caballus* and the *Hipparrison*. But further, it appeared that on comparing the bones of *Hipparrison*, *E. stenonis*, and *E. caballus*, some parts of *stenonis* showed little or no difference from *Hipparrison*, whilst others, as for example the lateral metacarpus and metatarsus of *E. stenonis*, were similar to those of *E. caballus*. This would be the paleontolgical succession of the fossil horses as shown by Dr. Mayor : *Palesterii*, eocene ; *Anchitherium*, middle miocene ; *Hipparrison*, superior miocene ; *Equus stenonis*, pliocene ; *Equus intermedius*, pliocene (as named by Dr. Mayor) ; *Equus caballus*, quartenary.

ORDINARY MEETING, Feb. 10th, the president in the chair.—Mr. Firth showed some splendid specimens of *Rhododendron* in full bloom. Mr. J. Tindall showed the following specimens in geology, obtained from the neighbourhood of Hepworth Ironworks and the Ainley bed of coal :—*Orthoceras*, *Aviculo-pecten papyraceus*, *Goniatites*, and *Posidonia*. Mr. J. Whitwam exhibited a specimen of *Haynia paynaria* caught by him in Farnley Woods. Mr. J. French read a very interesting and instructive paper entitled “A Biological Sketch.” He began by explaining that biology included both botany and zoology—in fact the science of living beings, of animals and of plants. After slightly dwelling upon the various opinions and theories of several authors as to what is life, the lecturer said that the various opinions expressed nothing, and that no rigid definition can be given, but we may say that life is a collective term for the tendency exhibited by certain forms of matter under certain conditions to pass through a series of changes in a more or less definite and determinable order or sequence. He also gave an exhaustive description of protoplasm, in which he stated that protoplasm was the basis of all life, and after giving the chemical combination of protoplasm in animals and plants, the lecturer most minutely described three of the lowest and simplest forms in which life manifests itself, viz.,—*Torula*, *Protococcus*, and *Amoeba*. The mud-looking refuse of the *Torula*, or yeast plant, was neither more nor less than a mass of minute living plants. *Protococcus*, an elementary form of plant life, consists of only one cell, green or red ; they may easily be seen by collecting some of the green scum that is so often observed on damp walls, &c, which, when mixed with water and placed under a microscope, will be found to consist of a multitude of rounded cells. The phenomenon called “red snow” is due to the presence of multitudes of this plant. The next simple organism of which the lecturer spoke was the *Amœba*, the humblest representative of the animal kingdom.

LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—238th meeting, Tuesday, January 30th, Mr. Samuel Jefferson, F.C.S., president, in the chair.—Mr. J. Holmes Walker, of Pudsey, gave an interesting lecture on "The Two Electrical Theories," illustrated by a large display of apparatus and diagrams. There was subsequently a good discussion.

240TH MEETING, Tuesday, February 13th, Mr. S. Jefferson, F.C.S., president, in the chair.—Mr. Frank Curzon gave a lecture on "The Scientific Bases of Physiognomy," illustrated by diagrams and freehand sketches on the black board.—W. D. R.

LEEDS CONCHOLOGICAL CLUB.—A small Society, intended more for practical work than is usually the case, was founded on the 12th October, 1876, by the conchologists of Leeds. The meetings are fortnightly, at the residences of the members; seven have been held, including the one on the 1st February, 1877. At the seven meetings the shells of the county have been well attended to, 150 records having been made and duly verified by specimens exhibited, 66 species and varieties being represented. The extra-Yorkshire geographical distribution of shells has also been well attended to, and other departments of the science have not been overlooked.

2ND MEETING, Oct. 26th, 1876, Mr. William Nelson, president, in the chair.—Mr. Henry Crowther undertook, by a series of chemical experiments, to prove the presence of a small quantity of phosphorus in the shell of the mussel (*Mytilus edulis*). The experiments were of an interesting nature, and clearly showed—giving credence to the tests laid down by our leading chemists—the existence of an element in shells, the presence of which has been denied by one of our leading conchologists—Dr. Jeffreys (Brit. Conchol., vol. i, p. xlvi). The whelk (*Buccinum undatum*) has also been tried by Mr. Crowther, but with so poor a result as almost to lead one to believe the truth of Dr. Jeffrey's statement: this subject Mr. Crowther intends to take up more thoroughly at some future time, and in a more systematic manner, thinking that it is of some slight importance to the conchologist.

4TH MEETING, Nov. 23rd.—The president (Mr. Nelson) remarked that specimens of *Cyclostoma elegans* from shady places were lighter in colour and larger in size than those found in more exposed situations, thus showing the influence of the presence or absence of light, and of surrounding conditions on the development of shells.

5TH MEETING, Dec. 7th, the president in the chair.—A letter from Miss E. B. Fairbrass, of Faversham, Kent, was read, confirming Mr. Nelson's views as to the influence of light, &c., on *Cyclostoma elegans*. At this meeting it was resolved to join the W. R. C. N. Society.

6TH MEETING, Jan. 11th, Mr. W. Nelson, president, in the chair.—Mr. John W. Taylor exhibited three species of *Tulstoma*—*T. magnifica* from the Alabama river, Ala.; *T. angulata* from Coosa river, Ala.; and *T. coosaensis* from same locality—and remarked that singular confusion

appears to exist with regard to their distinctness : as Binney, Haldemann, and others combine them in greater or less proportion ; but, judging from the specimens exhibited, the three species would appear to be abundantly distinct.

7TH MEETING, Feb. 1st, Mr. Wm. Nelson, president, in the chair.—Mr. Henry Crowther demonstrated the anatomy of the fresh-water mussel (*Anodonta cygnea*). The principal points touched upon were the attachments to the shell of the anterior and posterior adductor muscles, and their position *in situ* in the mollusc, followed by an explanation of the formation of the palial and muscular scars ; next were shown the position of the labial palps, the mouth, and the gills or branchiæ. Particular attention was directed to the situation and peculiar construction of the heart, the intestine passing through it, and the organ of Bojanus (kidney ?) underlying it, and other organs of the pericardial cavity. Next followed the manner of attachment of the gills, the formation of the branchial and cloacal chambers, &c., concluding by an exposition of the pidal and the parieto-splanchnic ganglia as illustrations of its nervous system.

MIRFIELD NATURALISTS' SOCIETY.—Meeting 3rd February.—Mr. Joseph Tindall (president of the Huddersfield Naturalists' Society) read a very interesting paper on “Insects destructive to root crops.” Several plants—a few of them in bloom—were produced and named. At this meeting the matter of Mr. Barber's testimonial was discussed, and it was unanimously agreed that Mr. Barber's long and unwearied endeavours as secretary of the W.R.C.N. Society ought to be acknowledged by making him a handsome present.

SELBY NATURALISTS' SOCIETY.—Meeting 23rd January.—A paper was read by Dr. Parsons on “The hard parts of animals, their composition, structure, and uses.” The uses of hard parts were stated to be—1st.—As cases for the protection of tender and important organs, *e.g.* the human skull, the shell of the oyster and crab. 2nd—To form a framework or skeleton for the support of the soft tissues. This skeleton is internal in vertebrate animals, external in many invertebrate animals, as the lobster ; in sedentary compound animals, as corals, it serves both to connect the several members of the community together, and to attach the whole colony to the rock or other substance on which it grows. 3rd—As levers or mechanical instruments of motion. 4th—For the seizing and mastication of food, *e.g.*, teeth and the hard plates found in the gizzards of some of the lower animals. 5th—As weapons of offence, as claws, teeth, horns, &c. In animals which fight for the females, as the stag, these weapons are often found only in the male sex. 6th—They form part of the mechanism of special organs, as the eye, the ear, the larynx, &c. Dr. Parsons then passed in review the several classes of animals, pointing out the general plan, structure, and chemical composition of the hard parts

met with in each class, as bone, cartilage, horn, and shell. The lecture was illustrated by many specimens having reference to the points alluded to, and by a fine series of microscopic objects, the microscopes being lent by Dr. Parsons, Mr. J. T. Atkinson, Mr. Cheesman, Mr. G. S. Hawdon, Mr. J. C. Haigh, and the Rev. J. R. Hewitson. Dr. Gray kindly sent a human skeleton for the lecturer's use.

24TH MEETING, Feb. 7th, the president, Mr. J. P. Atkinson, F.G.S., in the chair. The accounts of last year were presented and passed. The library arrangements were modified. Mr. Cheesman exhibited living specimens (under the microscope) of *Diatoma vulgare* and *Gomphonema acuminata*, &c. Mr. Woods presented to the museum a malformed lower jaw of a calf.

25TH MEETING, Feb. 13th, the president in the chair.—The Rev. R. J. Crosthwaite, M.A., of Brayton, near Selby, lectured on "The Moon." The lecture, which was illustrated by models, diagrams, and views, treated of the phases, distance, magnitude, shape, physical condition, libration, and uses of the moon.

STAINLAND NATURALISTS' SOCIETY.—Meeting 5th Feb., the president, Mr. J. E. Garside, in the chair.—Mr. S. Peel exhibited a pair of kittiwakes, and Mr. J. Edwards botanical specimens. The secretary gave a report which showed the Society to be in a flourishing condition. Several new works were proposed to be added to the library. Three new members were enrolled.—W. H. STOTT.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly meeting, Feb. 1st, Mr. Campbell, V.P., in the chair.—J. Spurling exhibited the small-eared owl, and Mr. G. H. Lumb, pied blackbird.—JOHN SPURLING, Hon. Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting Feb. 14th, Mr. T. M. Lambert in the chair.—Mr. Helstrip exhibited eggs of the roller (*Coracias garrula*), also the jaw-bone of a very large pike, caught in the Derwent on Feb 10th; Mr. C. D. Wolstenholme, eggs of the red-necked phalarope (*Phalaropus hyperboreus*), one of them a very remarkable variety; Mr. M. Smith, a nugget of pure San Franciscan gold; the secretary, a fine long series of *Noctua ditrapezium*, *Phlogophora empyrea*, *Catocala sponsa*.—WM. PREST, Hon. Sec.

TO OUR CONTRIBUTORS.

We beg to call the attention of our contributors, particularly the Secretaries of Societies, to the notice on the second page of our Cover, and to remind them that unless their reports are in our hands by the 18th of the month, we cannot insure their insertion. We have frequently received notices of meetings held on the earlier days of the month, later than the 20th.—EDS. NAT.

Diary.—Meetings of Societies.

- Mar. 1. Huddersfield Literary and Scientific Society (Botanical Section)—Paper: "The Linnæan System."—Mr. George Brook, ter., 8 p.m. Bradford Scientific Association.
Linnean Society of London.
- ,, 3. Mirfield Naturalists'.
- ,, 6. Bishop Auckland Naturalists'. Liversedge Naturalists'—Paper on "Food."—H. Franklin Parsons, M.D., of Goole. Selby Naturalists'.
- ,, 8. Bradford Scientific—Paper: "Crystallization."—Messrs. J. H. Walker and W. West. Leeds Conchological.
- ,, 9. Huddersfield Scientific Club—Paper: "On a new Freezing Microtome."—Mr. G. S. Woodhead, 8 p.m.
- ,, 10. Huddersfield Naturalists', 8 p.m.
- ,, 14. York and District Naturalists' Field Club.
- ,, 15. Huddersfield Literary and Scientific Society (Botanical Section)—Paper: "The Natural Systems of Classification."—Mr. C. P. Hobkirk. Bradford Scientific.
- ,, 20. Selby Naturalists'—Paper on "Flowers: their Colours, Perfumes, and Shapes."—Dr. Taylor, F.G.S., of Ipswich.
- ,, 22. North Staffordshire Naturalists', &c.—Meeting at Stoke. Bradford Scientific—Paper: "Sensitive Flames."—Mr. J. Walker. Leeds Conchological.
- ,, 26. Huddersfield Literary and Scientific Society—Paper: "The Pollution of the Colne by Huddersfield."—Mr. George Jarman. Huddersfield Naturalists'.
- ,, 29. Bradford Scientific—Paper: "The Colorado Potato Beetle." Mr. J. A. Douglas. Huddersfield Literary and Scientific Society (Botanical Section)—Paper: "The Geographical Distribution of Living Plants."—Mr. Joseph French.
- Apr. 2. Easter Monday.—West Riding Consolidated Naturalists' Society—Meeting at Wetherby for the Cowthorpe Oak.
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COMMUNICATIONS RECEIVED from Ovenden and Liversedge Societies unfortunately mislaid.

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No. XXI.

APRIL, 1877.

VOL. II.

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Original Articles.

LOCUSTS IN YORKSHIRE :

WITH SPECIAL REFERENCE TO THE FLIGHT OF 1876.

By WM. DENISON ROEBUCK.

(Read before the Huddersfield Scientific Club, February 9th, 1877.)

THE occurrence last autumn of a small flight of locusts, which seemed to have been almost entirely confined to Yorkshire, and of which several examples fell under my own observation, suggested to me the desirability of collecting information with regard to them, and of having some of the specimens authoritatively and correctly named. No sooner had I undertaken to prepare a paper upon this subject for the *Naturalist*, than it seemed desirable to complete the account by including notices of all such flights as I could ascertain to have been observed in this county in previous years, for it seemed to me that more light would be thrown on the probable direction and line of migration of one flight by a comparison of its distribution with that of previously recorded occurrences, than by viewing the occurrence as an isolated phenomenon. Still further consideration induced me also to notice, more briefly, the distribution of locust-flights throughout the kingdom at large. Previously to the establishment of the *Annals and Magazine of Natural History* and of the *Zoologist*, very scanty records are available for the study of locust-flights, and this circumstance proves the utility of natural history journals appearing at frequent intervals as vehicles for the recording of facts and occurrences which would otherwise be permitted to sink into oblivion.

1842.

Consequently the first visitation of locusts in England of which anything like a satisfactory record is preserved is that of 1842, reported in the 2nd vol. of the *Zoologist* for 1844, and the 1st vol. of the *Annals*. To take the Yorkshire specimens first: Mr. Henry Denny (*Ann. and Mag. Nat. Hist.*, Oct., 1842, x. 158) recorded that "last week" (writing Sep. 15) a fine specimen of *Locusta Christii* was brought to Leeds in a waggon of lead from Pateley Bridge. For the name he refers to Curtis's figure and description. Mr. Denny further reported the capture of three locusts "last week" at Scarborough, on the authority of the *Scarborough Herald*. One was reported in the *Sheffield Mercury* of the 10th Sept., taken in that town (Edwin

Brown *Ann. and Mag. Nat. Hist.*, Oct., 1842, x. 157). Two locusts were taken on the 9th September, 1842, by a labourer at Holmpton (a village in the East Riding, situated quite on the sea), in a field of oats. These specimens were kept alive by Mr. Wm. Sherwood until the 18th and 26th of the same month. Three other specimens were taken in the same vicinity, one at Hollymor, a village about two miles from the sea, and two at Roos, about a mile from the coast. Two were caught at Scarborough during the week preceding the 8th of September, one of which was preserved by Mr. Williamson for the Scarborough Museum (all these examples recorded by Wm. Sherwood, of Patrington; *Zool.*, 1844, ii. 477 & 478). No doubt the Scarborough examples are the same as those reported by Mr. Denny. Other specimens occurred near Derby (recorded as male *Locusta Christii*); Stafford; Chesterfield; and Burton-on-Trent. We thus see the remarkable preponderance of specimens in and about the district of Holderness, all the other records being of single examples only. Such of the specimens as were named were referred to Curtis's *Locusta Christii*, a species which is usually considered by authors to be synonymous with *Pachytylus cinerascens*. Mr. MacLachlan, however, tells me that he has referred to Curtis's figure, and that it is certainly *not* *cinerascens*, but appears to be *migratorius*, and adds that perhaps Curtis's idea of the latter was *cinerascens*. The type specimen upon which *L. Christii* was founded went with the rest of Curtis's collections to Australia, and therefore cannot now be readily appealed to for the settlement of this question.

1846.

The most numerous, though perhaps not the most widely distributed visitation of locusts of which I have read, occurred in the year 1846.

On the 26th August one was taken in a barley-field about eight miles from Knaresborough (J. C. Garth; *Zool.*, 1846, iv. 1518). Twelve occurred during September, in and about the city of York, one of them near Shipton, about five miles north, and another in the Cattle Market close by the city walls, on the 14th September (R. Cook; *Zool.*, 1846, iv. 1519). One was taken on Flamborough Head in the beginning of August, and two at Bridlington about the 28th (T. Vernon Wollaston; *Zool.*, 1846, iv. 1519). Seven specimens occurred near Redcar during September (T. S. Rudd; *Zool.*, 1846, iv. 1520). One at Sigglesthorne on the 9th September, and several others about the same time. The *Hull Packet* of Sept. 25th reported that the whole coast between the Humber and the Tweed had been

more or less subject to inroads by myriads of locusts, apparently bending a course towards the south ; and then stated that a few days before, a cloud of them settled temporarily near Spurn Point, and that about the same time several stragglers were taken alive at Cleethorpes. On the 8th September one was taken at Patrington, and three on the 10th at Easington, about five miles from Spurn Point. One of the three was deposited in the British Museum. Mr. Sherwood, visiting Spurn Point on the 29th September, found, from the quantity of dead specimens kept by the villagers, as well as from their accounts, that the newspapers had by no means exaggerated the numbers of these insects (Wm. Sherwood : *Zool.*, 1846, v. 1678-9). One occurred at Hessle, near Hull (E. Peacock, *Zool.*, 1847, vi. 2000).

Such are the Yorkshire records for 1846 : let us now turn our attention to those recorded from other parts of the kingdom.

About the second week of August it is recorded that a large flight of locusts passed over Sunderland ; they hovered in the neighbourhood of Hendon, and numbers alighted on the hedges there, till, a crowd beginning to collect, they took flight towards the south, appearing to conduct their migration in close company ; several were caught (*Zool.* : 1846, v. 1678). One occurred at Marsden, near Newcastle-on-Tyne, Sept. 11, one at Newcastle, another at Marsden, and one at Linten, near Morpeth. Further south we have our Yorkshire records, coast examples predominating. Then we hear of a few stragglers at Louth, in Lincolnshire, in the beginning of September, of flights near Cromer, and near Yarmouth, in Norfolk, and of numerous instances of single pairs in that county. At Chelmsford, in Essex, were reported two specimens. Again we hear of them abundantly along the coast of Kent, about Margate.

All these instances, it will be observed, are from localities upon the east coast, and that in some cases the reports speak of large numbers, amounting to flights, especially at Sunderland, about Spurn Point, on the Norfolk Coast, and at Margate.

Further inland we find that one was reported early in September by Mr. Henry Doubleday, at Epping, and that the London district yielded a large number of single occurrences, at Camberwell, Peckham Rye, Hyde Park, Kingsbury, Stanmore Marsh, Islington, Walthamstow, Highgate, Richmond, Hammersmith, &c. No doubt the reason for so many occurrences round London is the same that causes the London District to be so prolific in new and rare species of insects in all orders, namely, the fact of there being so many qualified entomo-

logists resident in and about the metropolis. Yet it is to be noted that in spite of there being so many single records, in no instance is mention made of flights or swarms near London, as on the coast. About Cambridge they occurred at Fulborne and Duxford. In the county of Leicester several are noted, including one at Skeffington and a pair at Leicester; and in the neighbouring county of Rutland, one at Uppingham. One at Lenton, near Nottingham; and in the county of Worcester several during September. The north-western counties produced one specimen only, in the city of Manchester, Sept. 4th; Wales only showed one, at the Nash Lighthouse, county of Glamorgan; and the southern counties one, at Bembridge, Isle of Wight, in August. The south-western counties, Devon and Cornwall, seemed, however, to represent another centre of distribution, for single specimens were reported from Dawlish and Exmouth, in Devon; and in Cornwall from East Looe, St. Just, and Penzance, while vague mention is made of "others" within a short distance of the Land's End.

There are no records whatever of locusts in Ireland in 1846, and the Scottish ones are rather vague. The *Stirling Observer* speaks of flights of Egyptian locusts in various parts of Scotland, one of them being preserved alive in the Edinburgh Zoological Gardens. In the *Zoologist* (1846, iv. 1521), the Rev. George Gordon stated that the newspapers reported them to have been seen in Sutherlandshire and further north, though he seemed to have little confidence in the reliability of those accounts.

Commenting upon the evidence which I have just summarised, the most obvious remark which can be made is that the visitation was most decidedly eastern in its distribution, thus pointing to immigration from the European continent. All the mentions of flights or of swarms, in fact of any considerable numbers, are from localities upon or near the east coast. In like manner, the single occurrences, though scattered over the midland counties, betray a decidedly eastern tendency, a tendency which is not neutralised by the occurrence of solitary stragglers at Manchester, Worcester, Glamorgan, Devon, and Cornwall.

It is to me a subject of regret that so few dates are published—so few that we are not able to ascertain whether the coast occurrences had any sort of priority in time.

With regard to the name, there seems to be a good deal of uncertainty: most observers are unable to speak of anything but "locusts": but it may be noticed that the insects are recorded as

Gryllus migratorius by such a distinguished entomologist as Mr. J. F. Stephens in two instances, that one brought to the British Museum is placed on record with the same name by Mr. Adam White, and that Mr. W. F. Evans states that his specimen was certainly *not Locusta Christii*, while Mr. Jonathan Couch satisfied himself that the Cornish specimens were *G. migratorius*. On the other hand Mr. Frederick Bond used the name *Locusta Christii* for the specimen taken at Kingsbury, Middlesex.

Further, De Sélys-Longchamps stated that *P. migratorius* was abundant in South Russia in 1844, and in 1845–6–7 occurred in North Germany, in Belgium, and in Sweden. In his opinion it is a form peculiar to Tartary or South Russia, only appearing in West Europe as an accidental visitor, though it may be reproductive here for a year or two under the influence of favourable circumstances. Possibly this was the case in Britain in 1846 and 1847.

1847.

The locusts again invaded England in the following year (1847), though not in such large numbers as in 1846.

On the 19th of August, Mr. J. S. Rudd, of Redcar, recorded that he picked up on the beach at that place twelve drowned locusts, and saw many others in the same state. Three were also captured alive on the sand-hills, and others seen, very alert on the wing (*Zool.* 1847, v. 1900). One was captured near York on the 26th August (Fred. Bond, *Zool.* 1847, v. 1900). Three were captured on the levels near Thorne, on the 3rd of September, by some harvesters, while passing a field of wheat; one of them was taken on the wing (Joseph Richardson; *Zool.*, 1848, vi. 2001). One was taken on the 5th September, in a field some distance from the town of Doncaster (John Hawley; *Zool.*, 1841, vi. 2116).

The visitation of 1847 was even more decidedly eastern in its distribution than that of the previous year.

No specimens whatever were reported from Scotland, Ireland, Wales, and the south-western counties; only two from the southern counties, at Battel, in Sussex; only one in the north-western counties, at Sunderland Point, near Lancaster; and in the midland counties we only find single specimens at Elton Moor in Derbyshire, Stamford in Lincolnshire, Duxford in Cambridgeshire, Hertford, and a few in the London district. The eastern tendency is shown by the occurrence of three or four specimens about Newcastle, three specimens about Bishop Auckland, large numbers of drowned examples on the coast at Redcar, single examples at Kingerley and

Millthorpe, Lincolnshire, several at Wisbeach, and eight at Cromer, Norfolk.

Of all the specimens recorded for 1847 only one occurred to the west of the central watershed line.

In noticing the occurrences in the preface to the *Zoologist* for 1847, Mr. Edward Newman hints at a record in some local paper or other, of locusts actually picked up at sea during that year.

We are in as great uncertainty as ever as to the name of the species ; most recorders, not knowing the specific differentiation, call it *G. migratorius* ; and Mr. Joseph Duff says of the Bishop Auckland specimens that they are "certainly the *Gryllus migratorius* of Linnæus." On the other hand Mr. Edward Newman states that "the specific identity of our locust with the *Gryllus migratorius* of the continent is not satisfactorily made out ; Mr. Bracy Clark has obligingly handed me Egyptian specimens which are evidently distinct." (*Zool.* 1847, v. 1900.)

As to the probable impelling cause of the invasion of 1847 Mr. Matthew Couch writes that it is very obvious that they have not been impelled by boisterous winds, as on the contrary the summer was very calm for two or three months previous ; it was also genially warm, while not excessively hot. He adds that they seem to have a repugnance to humidity and to a tendency to chill.

1848.

Mr. E. C. Rye placed on record (*Ent. W. Int.*, Oct. 3, 1857, iii. 7-8) that the *Gryllus migratorius* is of constant occurrence on the south coast, and that he had taken it so long ago as 1848 at Herne Bay, where it was quite plentiful in that year, and he understood that specimens are of frequent occurrence about Margate. I am not aware of any other records of locusts during this year.

1849.

At the Entomological Society's meeting on the 21st of March, 1870. Mr. J. W. Dunning exhibited a locust taken near Thirsk, in the autumn of 1849 ; the prothorax was flat and constricted in front, and he thought the insect to be the true *Gryllus migratorius* of Linné. This is the only specimen that I can find on record for the year 1849.

In consequence of my not having access to any sources of information on the subject, there is a considerable blank in my series of records, extending from 1849 to 1856.

1857.

The invasion of 1857 appears, from the very scanty indications given in the *Entomologists' Weekly Intelligencer* to have been not only

a very large one in point of numbers, but probably more widely and generally distributed in the British Isles than is usually the case.

The Yorkshire records in my possession number about half of all the specimens which were actually chronicled for the whole kingdom.

One was captured during the last week of August, on the grass-plot before the Huddersfield Infirmary (D. E. Brown, *Ent. W. Int.*, Sep. 19, 1857, ii. 197). Only a week before this occurrence some boys had shown Mr. Brown one, which they said had come from Africa in a bale of wool (*loc. cit.*) One was taken on the 23rd August, in a garden at Ripon by a lady (Edward Morton, *Ent. W. Int.*, Sep. 19, 1857, ii., 198; J. Hazledine Tutin, *loc. cit.*) One was taken near Malton on the 27th August (Jonathan Orde, *Ent. W. Int.*, Sep. 12, 1857, ii. 190), one in a house in Halifax "the other day," that is, some time in September (*Family Friend*, xix., 134). Mr. Edward Morton (*Ent. W. Int.*, Sep. 19, 1857, ii. 198) believed "several other locusts have been taken in Yorkshire during the present summer."

Now for other records: the first appears to have been at Stow-market August 22nd (C. R. Bree); three occurred at Newhaven, in Sussex, Sep. 7th; one at Walton Heath, Surrey, Sept. 2nd; two at Hove, near Brighton, about the 18th of September; and one at Southampton. When scientific names are given, it is *Gryllus migratorius* in every case. Three specimens of *Acrida viridissima* are placed on record as having occurred on the Sussex coast, two miles from Chichester, September 6th; it is quite possible that this *may* have been a mistake as to the name, and that the individuals so recorded were locusts.

These records appeared almost simultaneously, and then the publication of them was summarily stopped. The number of the *Entomologists' Weekly Intelligencer* for Oct. 10, 1857 (iii. 9), containing not a single record whatever, but instead thereof a leading article, from which I take the following extract:—

"LOCUSTS.—So numerous have been the communications we have received announcing the capture of specimens of *Gryllus migratorius*, that we have been obliged to desist from publishing them. Though the comet has not come, the locusts have; several hundreds appear to have been captured, and no doubt many more have escaped detection. They have not been confined to the south-eastern part of our island, but have been also met with in the north and west. Yorkshire has distinguished itself specially as a locust-detecting county, some have occurred in Scotland, and Devonshire and even Ireland

have likewise furnished specimens. In the emerald isle, indeed, one obligingly attended at Dublin during the meeting of the British Association, and allowed itself to be exhibited to the admiring savans."

I quote this, not only because it contains the only account we have of the distribution of this flight—which appears not only to have been a large one, several hundred specimens being spoken of in the extract, but also to have been unusually widely-spread, reaching even into Ireland and Scotland,—but because I wish to express my opinion that to suspend the publication of such records merely because they were numerous was a great mistake. No generalisation with regard to the probable line of migration can be framed in the absence of a basis of materials to work upon; and by suppressing the records of the visitation of 1857, the *Ent. W. Int.* has entirely prevented us from forming trustworthy ideas as to their distribution and ultimate origin. It is not the records themselves that should have been suppressed, but the irrelevant details with which they are apt to be accompanied; and the records should have been condensed or their salient points arranged in a tabular and systematic form, with the result of economising space and preserving at the same time a satisfactory account of a most interesting occurrence.

1858.

Mr. James Young recorded that locusts (*Gryllus migratorius*) had been plentifully taken near Hull, two being brought to him alive (*Ent. W. Int.* Sep. 25, 1858, iv. 203). No others appear to have been recorded in any part of the country in 1858.

1859.

Again the locusts appeared near Hull; several specimens of *Gryllus migratorius* captured in various places near that town—one being in the possession of the son of the Recorder—being placed on record by Mr. James Young (*Ent. W. Int.*, October 1, 1859, vii. 5). No other Yorkshire records have come under my notice.

Specimens were also recorded from Portsmouth about July 14th, rather early for locusts; Herne Bay, first week of September; ten about Northampton during the first fortnight of September; and one at Wallingford, in Berkshire. The specific name, when given, is always *Gryllus migratorius*.

These records are too few to found any views as to distribution upon, though it may be noted that all are eastern.

The years 1860, 1, 2, and 3 are a blank with regard to locusts, so far as I am at present aware.

1864.

In September locusts appeared in great numbers on the coast of Cornwall, and several of them which were in the possession of Mr. F. Walker he named *Pachytylus migratorius* (F. Walker in *Newman's Insect-hunter's Year Book* for 1869, p. 17).

The years 1865, 6, 7, and 8 are also blank years as regards locusts.

1869.

The visitation of 1869 is especially remarkable on account of the species being *Acridium peregrinum*, Oliv., new to the European fauna, and very different from either of the two closely allied species which usually favor us with visits, and also on account of the distribution also being opposite in its tendency. Instead of abounding on the east coast, the centre of distribution of *Acridium peregrinum* was Cornwall, where specimens occurred at Truro, Looe, St. Austell, and all along the coast from Plymouth to Penzance in great numbers, some reports mentioning 30 or so being captured at once. From Cornwall the swarm spread northwards and eastwards, occurring in Worcestershire, Warwickshire, Derbyshire, Staffordshire, and Nottinghamshire, and near Birmingham. A specimen also occurred at Waterford, in the south east coast of Ireland. At Burton-on-Trent several occurred; here they fell under the notice of Mr. Edwin Brown, who took some pains to investigate the occurrence. The species is widely spread through North Africa and East Asia, and in some parts excessively abundant and very destructive. Previously to this year it had never occurred in any part of Europe, nor did it even then occur on the continent, though Mr. Brown endeavoured to ascertain, through the medium of a French entomological periodical of wide circulation, whether they had been noticed in Western Europe at the same time as in England.

Considering these facts, and also that it is inconceivable that the species could have crossed the western portion of Europe without attracting the notice of Italian, Spanish, or French entomologists, Mr. Brown suggested a probable line of migration, which appears to be justified by our knowledge of the facts of the case. He suggested that a large flight had set out from the north-western coast of Africa, and having been caught by the south-easterly winds, had been mostly destroyed far out at sea; and that, owing probably to a westerly change of the wind, or to the survival of the fittest, the remnant had gained our Cornish coast, from thence dispersing themselves over the south-west moiety of England in a sparing manner (Brown, *E. M. M.* June, 1870, vii., 1-3.)

(To be continued.)

Rainfall for February.

HUDDERSFIELD.—During this month rain fell on 17 days, to the amount of 2·62in. The average of the last 11 years has been 2·63in., in 18 days. Snow fell on the 25th and 26th ; the fall on the night of the 25th averaged 10in.—a very unusual depth for this district.—J. W. ROBSON.

HUDDERSFIELD CEMETERY, 400 feet above the mean level of the sea.—Prevailing winds, W and NW : NW 17, W 7, SW 2, NE 2. General character of the month, wet, stormy and changeable, with heavy falls of rain and snow ; during the night of the 25th a sudden and heavy snow storm unparalleled in recent years occurred, and lay on the ground from 15 inches to 3 feet in depth in various parts of the country, and did considerable damage to trees and shrubs. The rainfall was in excess of the average, 4·15in. ; on 19 days rain or snow fell, slightly on 7 other days, but not sufficient to influence the gauge. The heaviest fall was in the form of snow, during the night of the 25th, when 1·42 in. were registered. From the 23rd to the 26th the barometrical column fell from 29·30 to 28·40. Rainfall for February, 1876, 2·98 in.—JAMES FIRTH, Registrar.

WAKEFIELD.—Rain fell on 20 days, making a total fall of 1·70in. The heaviest daily fall occurred on the 25th, when the gauge registered 0·58in. (rain and snow.) The lowest temperature was $22\frac{1}{2}^{\circ}$ the highest 55° ; greatest range for the month, $33\frac{1}{2}^{\circ}$.—FREDK. HILL.

BARNESLEY (350ft. above sea).—Total rainfall, 2·36in ; heaviest fall, 1·26in. on the 25th. Twenty-one days of rain or snow. Ingbirchworth Waterworks, 10 miles W (853ft.) : total, 3.62in. ; heaviest fall, 1·25in. on the 25th ; 20 wet days. Wentworth Castle (650ft.) ; total, 2·42in ; heaviest fall ·25 on the 20th ; days of rain, sleet, and snow, 21. There were 10in. of snow in depth ; the average around Barnsley was 11in., exclusive of drifts. Branches were broken down, telegraph wires injured : such intense frost (20°) and snow not being remembered so late for many years as in the three last days of the month. Wind blew from N W, W, and N, often with great force.—T. LISTER.

LEEDS (137ft. above sea, gauge 46ft. above ground).—Total fall 1·720in. The heaviest day's fall (26th) ·450 of an inch ; on the 19th we had ·220. and on the 25th ·280 of an inch. The above gives some idea of the snow fall, more than of actual rain.—H. CROWTHER.

GOOLE.—Total fall 1·82in. ; wet days, 19 ; greatest fall on the 25th, ·57in., melted snow.—H. FRANKLIN PARSONS.

Short Notes and Queries.

SPARROW SEEKING SHELTER.—During the storm of Monday evening last, about ten o'clock, I was somewhat surprised to hear a tapping against my sitting-room window, which overlooks the garden. On drawing the

blind I found a bird fluttering against the window. I threw up the sash and a sparrow immediately flew into the room, and after flying about for a minute, settled down in a corner, where it remained all night.—T.—Doncaster, 23rd Feb., 1877.

BLACKHEADED BUNTING.—About the middle of last January I happened to be in the vicinity of Castleford, where I saw at least half-a dozen black-headed buntings flying about an osier bed. To many of your readers perhaps the fact may not be worth recording, such a sight in winter being not an unfrequent occurrence ; this bird, however, is but a very rare visitor in this neighbourhood, and that only in winter." I believe it never breeds with us, "the softly swelling hills" obviously being unsuitable as breeding haunts.—E. P. P. BUTTERFIELD, Wilsden, March, 1877.

HYDRILLA PALUSTRIS.—I took a specimen of *Hydrilla palustris* in Norfolk last season.—THOMAS EEDLE, London, March 8th, 1877.

Reports of Societies.

BARNSLEY NATURALISTS' SOCIETY.—Meeting Mar. 5th.—The president, A. Kell, C.E. gave an opening address for the coming season. He remarked that it could not be expected to have recorded on that occasion so many rare birds as had been noticed at previous meetings,—as the buzzards, bitterns, great snipes ; yet observers would find much interest just now in watching the movements and changes of plumage in so many of our birds, so different from the winter season that some have been considered of different species. The pied and grey wagtail are assuming the black patch on the breast, the greater and lesser redpoles rose tints on head and breast, plovers, dunlins, &c., black on the breast. He said that now was the best time to master our resident birds before the spring migrants come, and while the trees are bare. He called attention to noting the dates of arriving and departing birds in excursions with the Yorkshire naturalists, commencing on Easter Monday, and in rambles and observations about home. There is much information needed, judging by the questions asked as to what are home birds and what are foreign migrants. The example was given of T. Edward, the Scotch naturalist, struggling under difficulties until the honest shoemaker is now rewarded with a small pension. The president presented the Society with "Edwards' Life," and "Darwin's Expression of the Emotions." Mr. W. J. Cope gave another volume of the "Entomologist." Mr. Kell showed some beautiful eggs.

BRADFORD NATURALISTS' SOCIETY.—Meeting Feb. 20th, the president in the chair.—Evening devoted to conversation and the exhibition of specimens. A number of early flowering plants were exhibited in bloom. Mr. Baxter exhibited a fine pair of the larvæ of *Cossus ligniperda* from

Cambridge. Mr. J. W. Carter took a fine specimen of *Anesopteryx cæsularia* on Feb. 18th.

MEETING March 6th, the president in the chair.—At the request of the president, Mr. William Jagger made a few remarks on entomology, giving some useful hints on the collecting and preserving of lepidoptera.

BRIGHTON AND SUSSEX NATURAL HISTORY SOCIETY.—Meeting Mar. 8th, the president, Mr. G. D. Sawyer, in the chair.—Mr. Herbert Goss, F.L.S., read a most interesting and valuable paper on "The Insect Fauna of the Tertiary Period." After reviewing at some length the various writings, books, and papers published on the subject, the author proceeded to enumerate the various strata of the tertiary period, and detailed first the insect remains found in the British area, and then those in foreign areas—the coleoptera, orthoptera, neuroptera, hymenoptera, and lepidoptera, with the number of species in each, and in many instances giving details of the various species, concluding with the forms found in amber. The paper was a most exhaustive one, and of such great interest both to geologists and lepidopterists that we regret we cannot give a longer abstract—indeed if we had the M.S. we should be glad to publish the paper in full, so that the interesting details might be more extensively known.

BURY NATURALISTS' SOCIETY.—Monthly meeting, Mr. Waddington in the chair.—Mr. Drake exhibited a finely-mounted specimen of the short-eared owl, shot near Woolfold in November last; Mr. Robert Kay a box of insects from Brighton, Sussex, containing *L. Polyommata*, *A. australis*, *P. empyrea*, *A. prodromaria*, and a case showing the life-history of several other lepidoptera; Mr. Jackson *E. Knautiata* and a curious beetle taken among logwood at Hinds. The secretary then read Mr. Alcock's paper on "Early Spring Flowers," which was illustrated by a number of specimens; and Mr. Wilson's paper, "A ramble in Yorkshire," was announced for next meeting.

GOOLE SCIENTIFIC SOCIETY.—A popular lecture in connection with this Society was given on Feb. 28th, by Mr. J. S. Harrison, of Hull, and was well attended. The subject was "The Arctic Regions." The lecturer traced the history of Arctic discovery from the reign of Henry VIII. to the late expedition under Sir George Nares, and gave a summary of the scientific results that had been achieved up to the present time. He then exhibited with the magic lantern a series of views illustrating Arctic scenery, life, and adventure.—H. FRANKLIN PARSONS.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting March 9th, Mr. C. P. Hobkirk, president, in the chair.—Mr. G. T. Porritt presented to the library the "Transactions" of the London Entomological Society for the year 1876. A fine collection of mosses was exhibited by the chairman, chiefly received from Mr. George Davies, of Brighton. They included—*Geheebia cataractarum* (*Barbula gigantea*) from Vallais, *B. nitida* from

Nice, *B. sinuosa*, *B. inclinata* from the banks of the Rhone, *B. inermis* from Tenda, *B. Vahliana* from Angmering, Sussex; *Leptotrichum pallidum* from Monte Generosa; also *Tortula ruralis* from Hawes, *Racomitrium lanuginosum* from Coverham Abbey, *Tortula intermedia* from near Ingleton, *Hypnum molluscum* from near Clapham, *Hyocomium flagellare* from Wessenden, Huddersfield, &c. In conchology, Mr. John Conacher exhibited *Helix aspersa*, showing the winter epiphram; *Planorbis cornutus* from Castleford, *Bithynia tentaculata* var. *excavata* from Askern; *Ancylus lacustris*; *Nereitina fluviatilis* from Wakefield; *Limnaea palustris* from Huddersfield, and the same species var. *decollata*, from Huntley, Scotland; and *Unio pictorum* from York. In lepidoptera Mr. S. D. Bairstow shewed three specimens of the beautiful yellow variety of *Zygæna filipendulae*, taken near Cambridge last season. Mr. S. L. Mosley, a very curious variety of *Abraxas ulmata*, in which the ground was a semi-translucent dull lead colour; the specimen was from Denby Dale; Mr. George Brook, preserved larvæ of *Nyssia hispida*, *Dipthera Orion*, *Diloba caeruleocephala*, *Hecatera serena* and *dysodea*, *Biston hirtaria*, *Bombyx castrensis*, *Liparis chrysorrhea*, *Hybernia defoliaria*, &c. Mr. Mosley also showed a long series of beautifully painted figures of exotic butterflies; they had all been executed by himself, and being life-like, elicited the admiration of every member present. Mr. Bairstow read a paper on "Scientific Nomenclature,"* in which he replied to the arguments advanced by Professor Newton, F.R.S., and Dr. H. Franklin Parsons, in their papers on the same subject published in a recent number of the *Naturalist*. A discussion ensued on the subject, joined in by most of those present.

HUDDERSFIELD NATURALISTS' SOCIETY.—Ordinary meeting, Feb. 26th, the president in the chair.—The following plants, in full bloom, were laid on the table by Mr. Lister Peace and Mr. R. Berry:—*Salix viminalis*, *Lamium album*, *Fragaria vesca*. Mr. R. Berry reported that he had found *Taraxacum officinalis* in full bloom several days before the meeting. In conchology the following specimens were exhibited by Mr. Joseph Whitwham:—*Clausilia laminata*, var. *albida*, *Succinea oblonga*, *Limnaea peregra*, var. *albida*, *Zonites radiatus*, var. *viridescenta-alba*, *Z. excavata* var. *vitrina*. Mr. J. Whitwham also exhibited a specimen of *Phigalia pilosaria*. A few specimens in geology were laid on the table by Mr. S. Mosley and Mr. J. Baxter, consisting of a nodule of carbonate of iron *Anthracosia*, and a few specimens of ammonites and iron pyrites. After the discussion which took place on the various specimens shown, Mr. Lister Peace read an able and interesting paper on "The Mollusca, their uses and injuries to man."

MEETING March 10th, the president in the chair.—Mr. Whitwham exhibited several specimens in geology, among which were silver ore from

* We propose publishing this paper shortly.—EDS. NAT.

Hong-Kong, limestone stalactite, and chalcedony. Mr. J. Baxter, several specimens of crystalline limestone. Mr. S. Mosley, a large number of coloured drawings of foreign lepidoptera, executed by himself. The specimens shown were chiefly from New Jersey and Panama. Mr. C. P. Hobkirk then introduced the subject of the testimonial to be given to Mr. Barber, late secretary of the W.R.C.N.S., and Mr. S. Bairstow was appointed to receive subscriptions. Mr. J. Robinson read a paper on "Spiders," at the close of which an interesting discussion took place.—
J. MACKENZIE, Hon. Sec.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—241st meeting (seventh annual meeting), Feb. 27. Mr. S. Jefferson, F.C.S., president, in the chair. The annual report showed that the year had been the most successful one the Society has enjoyed since its formation, that 60 members had been elected during the year, and that the Society numbered now 152 members as against 105 at the commencement of the period ; that 36 meetings had been held, papers being read at 16 of them ; that the excursions were those arranged by the W.R.C.N.S. and an extra one to Boroughbridge ; that certain modifications in the plans of the W.R.C.N.S. were contemplated, with view of increasing its efficiency and usefulness ; that on the suggestion of Mr. W. Nelson local collections to illustrate the fauna and flora of the county had been commenced during the year ; that the library had been well used by the members ; and that the treasurer's financial statement showed a balance in favour of the Society of £4 7s. 10d., and an income of £35 11s. 9d. The report and balance-sheet were unanimously adopted. The officers for the ensuing year are—president, Mr. James Abbott ; six vice-presidents ; treasurer, Mr. W. E. Clarke ; secretary, Mr. Wm. Denison Roebuck ; and council of six members. The retiring president, Mr. Samuel Jefferson, F.C.S., then read his valedictory address, in whlch, as stipulated by the rules, he reviewed the history of the Society during his term of office ; he added to this an interesting general sketch of the progress made by science generally during the same period. Previous to the annual meeting a special one was held to revise certain rules.

LEEDS CONCHOLOGICAL CLUB.—9th meeting, March 8th, Mr. William Nelson, president, in the chair.—Mr. John W. Taylor exhibited a portion of a very fine and large collection of land and fresh-water shells, collected at Zanzibar and Mozambique, East Africa, by Mr. J. S. Gibbon, M.B., and which is accompanied by a very full and interesting series of notes made thereon. He also exhibited some shells from the United States, while a very large number of Yorkshire shells were shewn by other members.

LIVERSEDGE NATURALISTS' SOCIETY.—Monthly meeting, Feb. 6th, the Rev. W. Fowler in the chair.—Specimens of *Lepidodendron obovatum* and *Neuropteris gigantea*, from the coal measures, were exhibited by Mr. Rothery, and several plants in flower by Mr. Boothroyd. By means of a

suitable apparatus the president collected the gas and water produced by the burning of a taper, weighed them, and found them heavier than the taper burnt. The increase in weight was due (as was explained) to the oxygen of the air having combined with the carbon and hydrogen of the taper to form carbonic acid and water, which were detected in the usual way, by caustic potash. The experiment was useful to naturalists as showing that the particles of matter of which any substance is composed can be separated and re-combined, but cannot be annihilated.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting at Illingworth, Feb. 3rd, Mr. Roger Earnshaw, vice-president, in the chair. A number of fossils were exhibited by Messrs. Cockcroft and Smith, rare specimens. Mr. T. Hirst exhibited and named the following birds and animals, viz., one pair of snowy owls, one racoon, and one polecat, from America ; and also one red deer's head.—[Secretaries should give names and localities of fossils and other specimens exhibited ; communications are of no interest whatever without these.—*Eds. Nat.*]

MEETING March 3rd, at Illingworth, Mr. T. Scott, president, in the chair.—Mr. John Hirst exhibited a beautiful peacock butterfly (*Vanessa Io*) which he had caught on the 17th of February, near the new Board school, Moorside, Ovenden, where no doubt it had lived during the winter months. Mr. T. Hirst exhibited a snowy owl, from Scotland ; a polecat, from America ; and a fox from Castle Carr.—JOSEPH OGDEN, Hon. Sec.

RASTRICK AND BRIGHOUSE NATURALISTS' SOCIETY.—Monthly meeting, March, Mr. E. Whiteley, president, in the chair.—The following is a list of some of the specimens which were exhibited :—Geology : head plates and jaws of *Osteolepis major*, from the Low Moor coal measures, by Mr. George Lister. Conchology : seven species of *Zonites*, viz., *Z. cellarius*, *alliarius*, *nitidulus*, *purus*, *nitidus*, *excavatus*, and *crystallinus*, by Mr. George Lister ; *Helix nemoralis*, *H. aspersa*, *H. virgata*, by Messrs. E. Whiteley and J. Noble. Mineralogy : a specimen of silver ore from an American mine, by Mr. E. S. Cooper. Botany : the following plants were all exhibited in bloom, and named by Mr. John Hirst :—*Ficaria verna*, *Mercurialis perennis*, *Luzula Forsteri* (?) *Anemone nemerosa*, *Petasites vulgaris*, *Salix caprea*, *Potentilla fragariastrum*, and *Chrysosplenium oppositifolium*.—A. CLARKE, Sec.—[We should be glad to see the specimen of *Luzula Forsteri*, and to learn where and when it was gathered.—*Eds. Nat.*]

SELBY NATURALISTS' SOCIETY.—26th Meeting, Feb. 27th, the president, Mr. J. T. Atkinson, F.G.S., in the chair.—Mr. Vincent Taylor read a paper on "Carbon and Flame." The points treated were the structure of a gas flame, and the difference between an ordinary and a Bunsen flame ; the distribution and forms of carbon ; the formation of coal and preparation of coal gas ; the causes of explosions in mines, and the use of

the Davy lamp in preventing them. The paper was illustrated by experiments. An interesting discussion followed on the effect of carbonic acid on animal life during the carboniferous period.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Annual meeting, Mr. C. D. Wolstenholme in the chair. There was a large attendance of members. The annual report was read by the secretary, which mentioned that during the season several very interesting excursions had taken place, one in conjunction with the Leeds, Huddersfield, and Richmond Societies to Copgrove Woods, Staveley Carrs, and Aldborough being a great success. Members have also attended several excursions of the Yorkshire Naturalists' Union. Many valuable and rare specimens of natural history had been exhibited during the year. Notably amongst birds were the rough-legged buzzard, common buzzard, white jay, knott, turnstone, great grey shrike, hawfinch, bittern, &c. In oology many rare and local eggs have been exhibited by Messrs. Wolstenholme, Gillah, Helstrip, C. S. Prest, and others ; and a successful excursion was made by the veteran naturalist, Mr. J. Harrison, and Messrs. Wolstenholme and Gillah to the Shetland Islands, where they succeeded in taking some rare eggs. In entomology several rare and local species have been exhibited — *C. fraxini*, *C. celerio*, *N. ditrapezium*, *B. roboraria* and *abietaria*, *P. empyrea*, *N. hispidaria*, bred from larvæ taken at Cawood ; *T. leucographa*, *E. orbicularia*, *L. purpurarea*, *L. viretata*, &c., and two specimens of *E. subciliata* taken by Messrs. Prest and Jackson during the excursion to Copgrove in August last, and new to Yorkshire. The report having been unanimously adopted the following offices were filled for the coming year :—President (the Lord Mayor), vice-presidents, honorary secretary (Mr. Wm. Prest), &c. Mr. J. Harrison, of Wilstrop Hall, exhibited a magnificent collection of birds and eggs, including all the birds of prey inhabiting the British Isles. Amongst the birds exhibited were the golden and white-tailed eagles, osprey, Iceland falcon, marsh harrier, hen harrier, Montague's harrier, kite, honey buzzard, rough-legged buzzard, hobby, and orange-legged hobby. Mr. J. Ripley exhibited a white specimen of the skylark (*Alauda arvensis*) shot in Askham Bogs ; a pied blackbird (*Turdus merula*), from Gilling Park ; and a fine specimen of the hawfinch, shot in Aldby Park—all of them occurring in January, 1877. The chairman (Mr. C. D. Wolstenholme), a preserved specimen of the shark, evidently not many days old. Mr. Helstrip, a skin of the bearded vulture from India. Mr. Hartley, a Brazilian mat, made of grass. Mr. M. Smith, a reference book of British mosses. Mr. J. Robinson, *Lobophora lobulata*, *Nyssia zonaria*, and *Ypsipetes ruberata*, all bred this season. Mr. Webster, shoots of yew with gall midge (*Cecidomyia taxi*), and the bean weevil (*Bruchus rufimanus*). The secretary, two large specimens of the rhinoceros beetle from Brazil, and a box of Tortrices.

Diary.—Meetings of Societies.

- Apr. 2. Easter Monday.—West Riding Consolidated Naturalists' Society—Meeting at Pontefract
- ,, 3. Bishop Auckland Naturalists'. Liversedge Naturalists'. Selby Naturalists.
- ,, 4. Entomological Society of London.
- ,, 5. Linnean Society of London. Leeds Conchological Club.
- ,, 7. Goole Scientific—Excursion to Rawcliffe, followed by Annual Meeting. Huddersfield Naturalists'.
- ,, 10. Selby Naturalists'—Paper on "Flowers."—Dr. Taylor, F.G.S., of Ipswich. Leeds Naturalists' Club, &c.—Paper on "Cyclones."—Mr. Samuel Jefferson, F.C.S.
- ,, 11. York and District Naturalists' Field Club.
- ,, 13. Huddersfield Scientific Club—Paper by Mr. G. S. Woodhead.
- ,, 17. Leeds Naturalist' Club, &c. Selby Naturalists'.
- ,, 19. Linnean Society of London. Leeds Conchological Club.
- ,, 20. North Staffordshire Naturalists', &c.—Excursion to Rugeley.
- ,, 23. Huddersfield Naturalists'.
- ,, 24. Leeds Naturalists' Club, &c.—Paper: "Flame," with Experiments.—Henry Pocklington, F.R.M.S.

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MAY, 1877.

VOL. II.

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Original Articles.

LOCUSTS IN YORKSHIRE :

WITH SPECIAL REFERENCE TO THE FLIGHT OF 1876.

BY WM. DENISON ROEBUCK.

(Concluded.)

DURING the same autumn (1869) another species of locust, which Mr. F. Walker first named *P. migratorius*, "with his usual care," and afterwards corrected to *P. cinerascens*, invaded the county of Aberdeen, occurring all along the coast and as far west as Balmoral, where large quantities were seen on the way to Loch-na-gar (W. C. Angus, *Entomologist*, April, 1870, v. 58.)

Concurrently with these two simultaneous invasions by two different species a couple of single examples occurred in Yorkshire. One taken in Richmond was exhibited at a meeting of the Richmond North Riding Naturalists' Field Club, Dec. 14, 1869 (*Scientific Opinion*, Jan. 5, 1870, iii. 23). The other was taken by Mr. W. Elliott, gardener, Queensbury, near Halifax, in his garden, at the end of August or beginning of September (*Newman's Entom.*, April, 1870, v. 58). No name is assigned to either of these specimens, and it seems to me, if they could be seen and examined, highly probable that we should be able to add the name of *Acridium peregrinum* to our Yorkshire fauna: seeing that they seem to approximate in distribution more to the southern than to the northern invasion.

1874.

Mr. Charles Williams (*Science Gossip*, Feb., 1877, p. 21) states that the villagers of Cheddar, in Somerset, reported to him that large numbers visited their vicinity in 1874, committing havoc in gardens, and that their description of appearance exactly tallies with a specimen of *Pachytylus migratorius*, sent to him from Egypt.

1875.

The years 1870, 1, 2, 3, and 4 are devoid of any records, so far as I can ascertain, and the whole of the specimens of 1875 were confined to our own county of York.

On the 5th July, Mr. B. Bagshawe, of Sheffield, picked one up alive in High-street, the second he had caught in the same locality (*Sheffield Daily Telegraph*, Tuesday, July 6th, 1875.) On the 11th September a locust was found in a field below Clifton, near Brig-

house, and afterwards conveyed to Halifax, where it was examined by the curator of the museum (*Brighouse and Rastrick Gazette*, Saturday, September 18th, 1875). Mr. Philip Lawton, of Easington, near Spurn, in a letter to Mr. N. F. Dobraé, of Beverley, states that he had two brought to him by some neighbours in 1875, and that they are of frequent occurrence in that neighbourhood.

1876.

The specimens which occurred in this country in 1876 appear to have been almost entirely confined to our own county of York, as I have only heard of two other specimens taken in that year, both of them western in their distribution, the localities being the neighbourhood of Machynlleth in North Wales, and Wells in the county of Somerset: while we are in possession of records of 22 taken in the East and West Ridings, and one from the North Riding of our great county.

I will now give such particulars with regard to each occurrence as I have been able to ascertain, arranging them, so far as it can be done, in chronological sequence.

1. One was taken on the 22nd of August, flying in the neighbourhood of Napier-street, Laister Dyke Station, Bradford, by Messrs. W. A. Bruce and J. Bentley (*Bradford Observer* and *Leeds Mercury*, Thursday, Aug. 24th, 1876). This specimen has since been exhibited for a length of time in a Bradford shop-window. I have seen this specimen several times, by the kindness of my friend Mr. Thos. Tate.
2. About the same time one was caught in a field near to Messrs. D. Evans and Son's factory, Armley Green, Leeds (*Leeds Mercury*, Friday, August 25th, 1876). This example is now the property of the Leeds Philosophical and Literary Society.
3. One was taken on the 27th August, in a field belonging to Mr. Simeon Woodhead, at Buttershaw, near the King's Head Inn, Halifax-road (*Bradford Observer*, Thursday, Sept. 7th, 1876). I was not able to procure the loan of this individual, and consequently have not had the opportunity of comparing it with the specimens in my possession.

4. One flew into a private watchman's box near East-parade Chapel, Leeds, between three and four o'clock in the early morning of the 30th of August, and was caught by the watchman, Mr. Thomas Peacock, from whom I succeeded in obtaining it. In some respects it is by far the finest of the 1876 specimens that have come under my

notice. The colour of the specimen is bright green, and the markings are readily distinguishable, while in most examples the colouring has become dark, and the markings obscured after death. I have placed this example in the collection of local insects which is at present being formed by the Leeds Naturalists' Club and Scientific Association.

5. Some time during the latter half of August an example was taken in Westgate, Huddersfield, and exhibited by Mr. G. T. Porritt, F.L.S., at a meeting of the Huddersfield Naturalists' Society, Sept. 2nd (*Naturalist*, Oct., 1876, ii. 43). Now in that Society's local collection.

6. About the latter end of August one was taken in the prison yard at Wakefield, and now belongs to Mr. William Talbot, who has obligingly allowed me to have it on loan for some time. This individual, which is one of the largest of the 1876 flight, was shown at the meeting of the West Riding Consolidated Naturalists' Society on the 9th September (*Nat.*, Oct., 1876, ii. 48).

7. Another example was taken at Wakefield about the same time by a boy in Bastow's Square. This has been seen by Mr. William Talbot, who gave me the information. I have not seen this example.

8, 9, and 10. Mr. N. F. Dобрée, of Beverley, informs me that two were taken there during the latter half of August, which he saw alive. He states that the length was fully $2\frac{3}{4}$ inches, and the colour grass-green, while that of a smaller specimen taken at Spurn (the extreme south-eastern point of Yorkshire) during the first days of September, is a more yellow shade of green.

11. One was captured on the 1st of September at Acaster Malbis, near York, perched upon a sheaf of corn, in a field belonging to Mr. J. Raimes (*York Herald*, Wednesday, Sept. 6th, 1876). I am under great obligation to his son, Mr. H. Raimes, for lending me the specimen, and also for furnishing me with much information of an interesting character with regard to its habits during a captivity of two weeks. He remarked that it had rather a peculiar musky smell, and that it could leap a distance of two or three yards, using its wings to assist it. It was very fond of eating the leaves of apple and pear. On fine days it was very lively, and leaped about a good deal—relaxing on dull days and in the evenings into a semi-torpid state. The muscular strength of its well-developed hind legs was very great, and Mr. Raimes gave me various instances to show the power that it possessed.

12. On the 6th September one was discovered in a field near the cemetery at Scarborough, "enjoying the beauties of nature," and is in the possession of its captor, Mr. B. Medley, of that town (*Scarborough Daily Post*, Thursday, Sept. 7th, 1876). I regret that I was quite unable to persuade Mr. Medley to entrust the insect to me for comparison.

13. Mr. William Fennell, of Wakefield, is the possessor of a specimen taken in one of the streets of that town during the first week of September, and kept alive by him for ten days. In communicating this information, Mr. Fennell informs me that he has taken them in Spain, between Cordova and Montilla, and that this year (1876) large flights have been carried by south winds from Africa into Andalusia.

14. A specimen which was taken in a field near the Horticultural Gardens, Hyde Park, Leeds, by a boy named Mitchell, which came into my possession, I have deposited in the Leeds Naturalists' Club's local collection. It is a small specimen, and not in very good condition.

15 to 22. No less than eight locusts, captured in his neighbourhood, three of which he had in his own possession, are mentioned by Mr. Philip Lawton, of Easington, near Spurn, in a letter to Mr. N. F. Dобрée, which letter Mr. Dобрée has communicated to me. I have since corresponded with Mr. Lawton himself, and obtained from him a fine pair, very dissimilar in size, which I have deposited in the Leeds Naturalists' Club's local collection.

23. The latest in order of date appears to be one which was taken on a lady's dress in Spring-street, Huddersfield, on the 27th Sept., and exhibited by Mr. J. B. Littlewood at the meeting of the Huddersfield Naturalists' Society on the 30th of the same month (*Naturalist*, Nov., 1876, ii. 60).

Of these 28 specimens I have seen those numbered 1, 2, 4, 5, 6, 11, 14, 15, 16, and 23. The 2nd, 5th, 6th, and 23rd examples have also been submitted to Mr. Robert McLachlan, F.L.S., who kindly took the trouble to determine for me the name of the species to which they should be referred, and who also exhibited them on my behalf at the meeting of the Entomological Society of London on the 6th of December. He considers that they are referable to *Pachytylus cinerascens* (Fab.), in which opinion Baron de Sélys-Longchamps, the distinguished Belgian orthopterist, coincides.

In the *Entomologist's Monthly Magazine* for January, 1877 (xiii. 179 and 180) and February (xiii. 216), I gave a list of all the specimens enumerated above. To my first note Mr. McLachlan appended the following remarks, which I will take the liberty of quoting:—"It is generally acknowledged by orthopterists that there are two species confused under the name of *Pachytylus migratorius*, one of which should bear the familiar name, and the other that of *P. cinerascens* (Fab.) As I understand these species at this moment, the visitors to Yorkshire are the latter. There exists an idea that this breeds annually in certain parts of Northern Europe (e.g. Belgium) whereas the former only appears occasionally.—R. McLACHLAN."—(E. M. M., Jan., 1877, xiii. 180.)

In a subsequent note (E.M.M., Feb., 1877, xiii. 216), after stating that Baron de Sélys-Longchamps agrees with him in naming our 1876 examples *P. cinerascens*, Mr. McLachlan says that it is probable that the greater part of the locusts which occur in Britain appertain to that species.

Because most occurrences are recorded with the name *P. migratorius* we are not hastily to conclude that the recorders have attempted to make a distinction between the two closely allied species; for it is very probable that most naturalists, when recording the capture of *P. migratorius*, simply wish to announce that they have taken a "locust," and not to imply that they have attempted to discriminate between the two species.

Thus, a specimen which was taken in Leeds several years ago, and which is not included in my list given above because I am not aware of the precise year of its capture, has been carefully compared by myself and Mr. W. H. Taylor, to whom it belongs, with the specimens taken last year, and also with descriptions, the result being that we cannot see that it is anything else but the same species.

The notion that *P. cinerascens* is really the commonly occurring locust in the British Isles, and *P. migratorius* a species of much more unfrequent occurrence, is supported by Mr. McLachlan's statement that "it is probable that the greater part of those taken in Britain are *cinerascens*"; and also by the opinion of the Baron de Sélys-Longchamps, "that he is persuaded that this species breeds regularly in Britain (as, according to him, it does in Belgium)," an opinion which Mr. McLachlan does not share (E.M.M., Feb., 1877, xiii., 216).

The European distribution of the two, as stated by M. Brunner van Wattenwyl (Sélys-Longchamps, *Ann. Soc. Ent. Belg.*, xi. 32) also strengthens this view. He states that *P. migratorius* inhabits Eastern

Europe, the region of the Black Sea, Himalaya region and Manilla, while *P. cinerascens* inhabits South-west Europe, the Mediterranean region, Greece, Syria, Algeria, Madeira, Canary Isles, Bengal, Manilla, Australia, and New Zealand. De Sélys-Longchamps adds that *P. cinerascens* is not erratic in Belgium; that it is reproductive there every year, though very local; and that it is also a truly indigenous species in South France, in Spain, and in Portugal.

It would be very interesting to know whether these insects actually breed in our country, or whether the specimens which so often occur here are merely visitors from the continent; but the materials at our disposal are hardly sufficient for this purpose.

Baron de Sélys-Longchamps, indeed, is persuaded that *P. cineras-cens* is truly a native of Britain, and this view would appear to be supported by such facts as that it is known to breed on the nearest parts of the Continent; that locusts appear to occur so often in this country when there is a medium for preserving records; and that sometimes they seem to affect particular places in large numbers during several sequences of years. I will instance the district of Holderness, of which Spurn Point is the apex. My records show that locusts occurred there abundantly in 1842 and 1846; also in 1858 and 1859, in which years they appeared to be confined to the Holderness district; and again in 1875 and 1876 Spurn appeared to furnish about the half of the whole numbers recorded.

On the other hand, it does not appear that immature specimens have ever been found, unless the very few examples recorded as having been taken so early as July can be regarded as such; and the fact of the largest numbers being recorded actually upon or near the East coast seem to point in the direction of immigration, direct from the European Continent.

Possibly the truth may be intermediate between the two extremes; that the major portion of the occurrences are truly "invasions"; and that occasionally the invasion of one year may give rise to the home-bred occurrences of the succeeding one.

Here I must leave the question, and conclude by thanking those friends who have so kindly assisted me in the compilation of this account; and I shall at all times be most happy to receive information upon the subject of invasions of this country by locusts, and that my interest in it will not be abated or terminated with the publication of the present paper.

Leeds, Feb. 5th, 1877.

A LIST OF THE LAND AND FRESH-WATER SHELLS
FOUND IN THE
NEIGHBOURHOOD OF HUDDERSFIELD.

By T. WHITWHAM.

THIS list of shells is the result of six or seven years' collecting. Huddersfield is seven miles from Halifax, and I have rather interfered on that side, as it will be seen I have named two from Salterhebble. On the north and east sides there is not much to be found after three miles without going a long way out of the district, and on the south side if we go three or three-and-a-half miles we get near the moors, where none but common shells can be found. The readers of the *Naturalist* will see that we have a number of shells absent from this district, for we have no stagnant ponds or canals suitable for them, as is the case in the Wakefield district.

AQUATIC:

Sphærium corneum, L. Plentiful in the canal.

„ „ var. *flavescens*, Macg. Rare, plentiful in canal.

„ „ var. *pisidioides*, Gray. Deighton.

S. rivicola, Leach. Rare, canal at Elland.

S. lacustre, Mull. Rare, Farnley Tyas.

„ var. *Ryckholtii*, Norm. Rare, Farnley Tyas.

Picidium amnicum, Mull. Rare, canal at Elland.

P. fontinale, Drap. Rare, canal at Elland.

P. pusillum, Gmelin. The Hey Wood, very local.

P. nitidum, Jenyns. Rare, canal at Elland.

Anadonta cygnea, var. *zellensis*, Gmelin. Canal near Elland, rather plentiful.

Bythinia tentaculata, L. Common in both Elland and Huddersfield canals.

B. tentaculata, var. *decollata*. Plentiful in ditto.

Planorbis nitidus, Mull. Common at Deighton.

P. vortex, L. Common in Huddersfield canal.

P. carinatus, Mull. Common in a dam at Deighton.

P. contortus, L. Not uncommon in Huddersfield canal.

Limnæa peregra, Mull. Common throughout the district.

„ „ var. *ovata*, Drap. Very rare in Elland canal.

Limnæa peregra, var. *acuminata*. Rare, Farnley Tyas.

„ „ var. *decollata*. Huddersfield canal.

Limnæa auricularia, L. Was formerly common, but is now rare, at Salterhebble.

L. auricularia, var. *acuta*, Jeffr. Very rare at Salterhebble.

L. stagnalis, L. Introduced species from Wallasey, first brought from there to this district by Mr. John Varley.

L. palustris, Mull. Found in a dam at Deighton.

„ var. *elongata*, do.

„ var. *conica*, do.

„ var. *decollata*, do.

L. truncatula, Mull. Not uncommon.

„ var. *minor*. Rare, dam at Mirfield.

Ancylus fluviatilis, Mull. I have gathered a few shells of this species in a stream behind Castle Hill, also at Thirsk Clough, Longwood.

TERRESTRIAL.

Arion ater, L., common throughout the district.

Limax flavus, L., rare.

L. agrestis, L., common throughout the district.

L. arborum, Bouchard-Chantereux. Rare, Greenhead-lane and Castle Hill.

L. maximus, L. Not common.

L. lœvis, Mull. Rather plentiful in Brighouse Wood.

Succinea putris, L. Rare, canal at Salterhebble.

Vitrina pellucida, Mull. Common in woods and shady places.

Zonites cellarius, Mull. Common throughout the district.

„ „ var. *complanata*. Rare, Farnley.

„ „ var. *albida*. Rare, Farnley and Elland.

„ „ var. *compacta*. Rare, Elland.

Z. alliarius, Miller. Common in woods.

„ var. *viridula*. Rare, Roydhouse Wood and Mellor Wood.

Z. glaber, Studer. Rather local, Elland.

Z. nitidulus, Drap. Common.

„ var. *nitens*, Mich. Rare, Roydhouse Wood and Elland

„ var. *Helmii*, Gilbertson. Rare, Mellor Wood.

Z. purus, Ald. Not very common.

„ var. *margaritacea*. Very common.

Zonites radiatus, Ald. Common in Roydhouse Wood, but very local.

„ „ var. *viridescenti*. Rare, do.

Z. excavatus, Beau. Common at Elland and Golcar, local.

„ „ var. *vitrina*, Fer. Common at Golcar, and in Roydhouse and Hey Woods.

Z. crystallinus, Mull. Common in woods.

Z. fulvus, Mull., do.

Helix lamellata, Jeff. Scarce in Roydhouse and Hey Woods.

H. aculeata, Mull. Common in do. do.

H. nemoralis, L., rare. I have found a specimen in Hey Wood.

H. hortensis, Mull. Wakefield-road side.

H. rufescens, Pennent. Common at Elland and Wakefield-road side, local.

H. rufescens, var. *albida*. Rare, Wakefield-road side, local.

„ „ var. *minor*, do. do.

(To be continued.)

Short Notes and Queries.

EARLY APPEARANCE OF THE COCKCHAFER.—Whilst walking in the fields at Royston on Sunday evening, April 1st, I noticed a single specimen of the cockchafer (*Melalontha vulgaris* Fab.), which I believe is rather an early date for its appearance.—A. P. TAYLOR, Mapplewell, nr. Barnsley.

RED-WINGED STARLING IN YORKSHIRE.—After a rather unsuccessful entomological tour on the 30th and 31st of March, I was rewarded, on crossing the Pontefract and Doncaster Turnpike Road (just after leaving Adwick-le-street), by seeing among the grass on the wayside a bird I took to be a dead blackbird, but on picking it up it proved to be a fine male red-winged starling. It had apparently been killed by flying against the telegraph wires.—S. L. MOSLEY, Huddersfield, April 18th.

Rainfall for March.

HUDDERSFIELD (Dalton, 350 feet above sea level).—The total registered has been 3·24 inches in 19 days, making a total for the three months of 10·75 inches. The average for the previous 11 years is 2·31 inches in 17 days, and the total for the first quarter 8·06 inches. Snow fell on three days. The heaviest day's rain was 1·14 inches on the 24th. The month has been cold and stormy, with more frosty nights than in January and February put together.—J. W. ROBSON.

HALIFAX.—It may possibly interest some of the readers of the *Naturalist*, and more especially those who regularly register the monthly rainfall, to know the amount of rain that fell during December, January, and February, as registered (360 feet above the sea level) at the foot of Pennine Range, in the vicinity of Halifax ; the amount, as will be observed being considerably higher than the fall in the Wakefield, Barnsley, and Goole districts.

	Wakefield.	Barnsley.	Goole.	Halifax.
	In.	In.	In.	In.
December	... 5·91	6·11	4·26	9·31
January	... 3·64	3·82	2·10	8·10
February	... 1·70	2·36	1·82	5·39
Total	... 11·25	12·29	8·18	22·80

The average fall near Halifax for these three months for the past five years, not including the record above given, is 11·45.—F. G. S. RAWSON.

WAKEFIELD.—Rain fell in this month on 19 days, the total depth being 3·30 inches. The greatest quantity measured in 24 hours was on the 24th, when the gauge yielded .70 inches. The temperature has been during this period nine times below freezing point ; on the 1st instant it fell to 19°—F. HILL.

BARNESLEY (350 feet).—2·78 inches on 21 days ; greatest fall, .57 inches on the 27th.—Corporation Works, Ingbirchworth (853 feet) : 2·74 inches on 20 days ; greatest fall, 1·14 inches on the 24th. Wind W, S W, N W, changing to N, N E, S E, often with great force. A thunder-storm occurred on the 27th.—T. LISTER.

LEEDS (137 feet above sea, gauge 46 feet above ground).—Total rainfall, 2·660 inches. The heaviest day's fall (24th), .630 in., on the 29th .580 in., on the 7th .310, and on the 2nd .250. Rain fell on 19 days. Snow on the 5th, 6th, 7th, 9th, 16th, and 18th. Hail on the 5th and 7th. The highest reading of the barometer was on the 1st, 30·220 inches, the lowest on the 25th, 28·843 inches, showing a monthly range of 1·377 inches ; the adopted reading for the month being 29·550 inches.—H. CROWTHER.

GOOLE.—Rainfall 2·20 inches ; wet days 17, greatest fall on 29th—.73 in. Temperature, maximum 53° F. on 28th ; minimum 10° on 1st : mean temperature of month 39·2°, mean daily range 11·8°.—H. F. PARSONS.

Reports of Societies.

BARNESLEY NATURALISTS' SOCIETY.—Meeting April 3rd.—The president (Mr. T. Lister) made a few remarks on birds, in addition to those given in his opening address, quoted in the April *Naturalist*. The month of March opened with the thermometer at 12° below freezing at Barnsley, and at 18° below at Stainboro' Park, three miles W. A sudden thaw at noon caused our home songsters to renew their melodies, only suspended

by the last few days of frost. Towards the close of March the corn or common bunting uttered his curious monotonous note on the 28th. The green linnet and meadow pipit were noted in song on the 30th ; the lesser redpole was also heard, and the wheatear (the first spring migrant) was reported on the western moors. It had been recorded by C. C. Hanson, on Greetland Moor, as early as the 21st March. The 1st of April brought the chiff-chaff, with its two short sharp notes, heralding the other warblers following in its course. Its congener the willow wren was heard April 12th. Mr. W. J. Cope in an excursion to the moors westward on April 2nd, experienced almost as rich a treat in birds as did the Yorkshire Naturalists' Easter excursion in the opposite direction. Betwixt Penistone and Saltersbrook he noted wheatears, golden and green plovers in great numbers, meadow pipits, and ring ousels, no doubt newly arrived. But the rarest birds were three curlews, called in Scotland " Wha-up," from one of their peculiar cries.

BRADFORD NATURALISTS' SOCIETY.—Meeting April 17th, the president in the chair. Mr. J. W. Carter read an interesting paper on "The Cowthorpe Oak." Mr. F. Bower exhibited a fine specimen of *Pieris crataegi*, taken by him at Dirkhill, near Bradford, July 2nd, 1876. This is the first specimen reported in this locality.—H. T. SOPPITT, Cor. Sec.—[Is there any doubt about this specimen? We were not aware it was a Yorkshire insect. *Eds. Nat.*]

BRIGHOUSE NATURALISTS' SOCIETY.—Monthly meeting, April 9th, Mr. E. Whiteley, president, in the chair. Several botanical specimens were exhibited, among which were—*Myosotis palustris*, *Caltha palustris*, *Luzula sylvatica*, *Betula alba*, *Luzula congesta*, var. of *L. campestris*, *Marchantia polymorpha*, all in bloom. Conchology : Seven species of *Limnæa*, by Mr. George Lister—*L. glutinosa*, *L. peregra*, *L. auricularia*, *L. stagnalis*, *L. palustris*, *L. truncatula*, *L. glabra*. These form a complete set of the genus—except one, viz., *L. involuta*, which is not found in this district. Mineralogy : a specimen of Calc spar, from the lower coal measures (Low Moor), by E. Whiteley. Several members reported having seen the swallow (*Hirundo rustica*) in the district. Mr. E. S. Cooper reported the tiger beetle (*Cicindela campestris*) on Norland Moor.

BURY NATURAL HISTORY SOCIETY.—Meeting, the president, Mr. Alcock, in the chair.—Mr. Robert Kay exhibited eggs of the quail, snipe, skylark, and meadow pipit, of the two latter white varieties. Mr. Wilson's paper, "A Ramble in Yorkshire," was then read.

GOOLE SCIENTIFIC SOCIETY.—The first excursion of the season was made on Saturday, April 7th, to Rawcliffe. The party first explored the "Rabbit Hills," a rough bushy piece of ground near the station ; they then went over the grounds of Rawcliffe Hall, and returned by road to Goole. A rich harvest of flowerless plants was obtained, but it was too early in the year for much else to be expected. The following were the

principal finds :—Mollusca : *Helix virgata*, *H. cantiana*, *Zonites alliarius*. Flowering plants : *Cerastium arvense*, *Ornithopus perpusillus*. Mosses : *Sphagnum cymbifolium*, *S. acutifolium*, *Tortula unguiculata*, γ . fr., *Orthotrichum affine*, *O. diaphanum*, fr., *Zygodon viridissimus*, *Atrichum undulatum*, fr., *Polytrichum juniperum*, fr., *Aulacomnion palustre*, *Bryum capillare*, fr., *B. nutans*, fr., *Mnium punctatum*, *M. rostratum*, *M. undulatum*, *Bartramia fontana*, *Leskeia sericea*, *Climacium dendroides*, *Hypnum cuspidatum*, *H. purum*, *H. serpens*, *H. praelongum*, *H. cupressiforme*, *H. elegans*, *H. squarrosum*, *H. rutabulum*, *H. Schreberi*, *H. velutinum*, *H. albicans*, *H. fluitans*, *H. confertum*, f., *Neckera complanata*. Hepaticæ : *Lophocolea bidentata*. fr., *Radula complanata*, *Fegatella conica*. Lichens : *Ramalina fraxinea*, *Evernia prunastri*, *Physcia tenella*, *P. parietina*, *Parmelia saxatilis*, *P. physodes*, *Peltigera canina*, *Cladonia pyxidata*, *Lecidea canescens*. Fungi : *Agaricus velutipes*, *A. separatus*, *A. furfuraceus*, *A. semiglobatus*, *Polyporus versicolor*, *Stereum spadiceum*, *Æcidium ranunculacearum*, *Peziza calycina*.—In the evening the annual meeting was held. The report of the committee for the past year was received and adopted.

HUDDERSFIELD SCIENTIFIC CLUB.—Ordinary meeting, April 20th, the president in the chair. In lepidoptera Mr. S. L. Mosley exhibited *Smerinthus ocellatus*, a hybrid between *S. ocellatus* and *S. populi*, including a fawn-coloured one bred at Bradford, and similar to the Irish variety. Mr. C. P. Hobkirk exhibited the following six mosses, which are all new to the district. They were all collected in Grimescar-road on the 14th instant :—*Tortula insulana*, *T. aloides*, *Encalypta streptocarpa*, *Hypnum cupressiforme*, var., *nigro-viride*, *Homalothecium sericeum*, and *Didymodon rubellus*; Mr. Geo. T. Porritt exhibited the following *Crambidae* :—*Crambus dumetellus*, *C. hamellus*, *C. uliginosellus*, *C. paludellus*, *Homœosoma sinuella*, *H. nimbella*, *Rhodophaea marmorella*, *R. suavella*. The secretary read a paper by Mr. G. S. Woodhead, on “An improved form of freezing Microtome,” together with several formulæ for imbedding media and staining solutions. Mr. Ed. Brooke, F.G.S., then called attention to two old river gravel beds in this neighbourhood—one at Hillhouse and one at Deighton—and compared them with two found in the valley of the Calder. This is the first time old river gravels have been noticed in the Colne valley.—G. B. ter.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting March 26th, the president in the chair.—Mr. Allen Godward showed a fine specimen of *Draba verna*. In conchology, Mr. L. Peace exhibited *Helix arbustorum*, *H. arbustorum*, var. *flavescens*, and var. *alba*.—A long discussion then took place upon the desirability of having a ramble every Saturday afternoon during the coming season, and resulted in the following resolution : “That there be a ramble every Saturday afternoon, from the 1st of April to the end of October.”

MEETING April 7th, the president in the chair.—A large number of botanical specimens were laid on the table by Messrs. Shaw, Clarke, Mackenzie, and Godward, amongst them were *Draba muralis*, *Empetrum nigrum*, *Linaria Cymbalaria*, *Petasites vulgaris*, *Veronica arvensis*, *V. serpyllifolia*, *V. officinalis*, *Tussilago Farfara*, *Caltha palustris*, *Chelidonium majus*, *Blechnum boreale*. Mr. J. Whitwam exhibited and presented to the Society two fine specimens of *Acme lineata*, from Royd House Wood, on March 11th. Mr. J. Tindall then read a paper on the "Geographical Distribution of Birds." The lecturer began by stating that the most striking fact in the limitation of species occurs amongst birds whose power of easy locomotion seems to place the whole world at their disposal. He then stated of the 26 species of land birds found in the Galapagos Islands, only one is found elsewhere. The lecturer then gave an account of the birds of Australia, which he said was peculiar in its distribution of birds. Parroquets, he said, range from 45° S. to within 10° of the equator, clinging to the highlands, and do not cross the intervening plains or to other mountain chains in the same latitude. The author then gave an exhaustive account of the humming birds. *Eriocnemus Derbianus* has never been found except in the crater of the volcano of Purace. The lecturer pointed out on a map of the world the geographical distribution of the common fowl—peacocks, nightingales, penguins, birds of paradise, turtle doves, and a large number of other birds.—J. MACKENZIE, Sec.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—The opening meeting of this Society was held in the small Lecture Hall, Brown's Museum, Liverpool, on the 26th March, when Mr. S. J. Capper, the president, delivered the inaugural address. The Rev. H. H. Higgins, prefacing his motion with some remarks of a most interesting general character, moved a vote of thanks to Mr. Capper for his very able address, and the meeting then formed itself into a conversazione, several of the members exhibiting objects of interest.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—242nd meeting, April 10th, 1877, Mr. Councillor Gascoigne in the chair.—Mr. Samuel Jefferson, F.C.S. gave an interesting lecture on "Cyclones."

MIRFIELD NATURALISTS' SOCIETY.—Meeting 7th April. Mr. J. Varley, of Huddersfield, read a very instructive paper on "British Song Birds."

NORTH STAFFORDSHIRE NATURALISTS' FIELD CLUB.—12th annual meeting, March 22nd.—There was a large attendance, and the proceedings were of a specially interesting character, the meeting having been chosen as the occasion for presenting the Rev. T. W. Daltry, the hon. secretary, with a revised edition of Curtis's "Flora Londinensis," together with an elegant sterling silver epergne, in recognition of the eminent services which he has rendered to the Club. The hon. secretary also read the treasurer's report, after which Mr. W. S. Brough, of Leek, was appointed president for the ensuing year, and the treasurer and honorary secretary were re-elected.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting, March 31st, Mr. T. Scott in the chair.—Mr. T. Sheard named the botanical specimens :—*Ulex Europeus*, *Stellaria media*, *Fragaria vesca*, *Caltha palustris*, *Arum maculatum*, *Primula vulgaris*, *Petasites vulgaris*, *Tussilago Farfara*. A number of geological specimens were exhibited and named by Messrs. Scott and Cockroft, viz :—*Goniatites Listeri*, *Orthoceras aululatum*, *Calamites cannaeformis*, *C. approximatus*, and *Lepidostrobus orneus* from the Northowram coal measures. The wheatear was heard on Nov. 27th, by Mr. T. Scott, at Brickfield, Ovenden. Mr. T. Hirst exhibited a number of British and foreign birds, amongst them being a pair of little owls, a pair of Chinese owls, a pair of snowy owls from America, four griffin vultures from Portugal, a pair of short-eared owls, a pair of long-eared owls, a pair of screech owls, and a beautiful case of pheasants and partridges.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly meeting, April 5th, J. Wainwright, Esq., F.L.S., in the chair.—Mr. Marson exhibited *Amphydasis betularia* (black variety). Mr. Wilcock *Zonites glaber*, supposed to be the first time taken in the district. Mr. Wainwright then proceeded to give an account of his Oriental tour, which he illustrated with specimens of shells, fruits, and ornaments, collected by him from Cairo, Athens, and the Nile.—JOHN SPURLING, Secretary.

YORKSHIRE NATURALISTS' UNION.—The opening meeting for 1877 of the West Riding Consolidated Naturalists' Society was held at Pontefract on Easter Monday, the 2nd of April. Nineteen Societies were represented during the day, the only Societies absent being Ripponden, Holmfirth, and Rastrick; and the attendance at the meeting numbered over 120 members. During the forenoon the districts round Pontefract, including the woods and grounds of Fryston Hall, by permission of Lord Houghton, were investigated by numerous parties of members. The geologists mustered strongly at some new cuttings on the line of the Swinton and Knottingley Railway, which is now in course of construction close to Pontefract. A large party of over 90 assembled at the ruins of the castle, over which they were ably conducted by Mr. Richard Holmes, and afterwards a visit was paid to the partly-ruined church of All Saints, under the guidance of the vicar. Tea was served at three o'clock at the Red Lion Hotel. At four o'clock trial was made of the new plan of meeting in sections, on the British Association principle, for the examination of the various specimens collected. There were five sections meeting separately and simultaneously. This being the first meeting under the new rules, the first business of each section was the election of its officers. The Vertebrate Section elected as president Mr. Wm. Talbot, of Wakefield, and as secretary Mr. Thomas Lister, of Barnsley. The Conchological Section elected as president Mr. Wm. Nelson, of Leeds, and as secretary Mr. Henry Crowther, of the Leeds Museum. The Entomological Section elected as president Mr. Wm. Prest, of York, and as secretary Mr. Geo. T. Porritt, F.L.S., of Huddersfield. The Botanical

Section elected as president Mr. Joseph Wainwright, F.L.S., of Wakefield, and as secretary Dr. H. Franklin Parsons, of Goole. No officers were chosen by the Geological Section.—The combined general meeting was held at five p.m., the Rev. William Fowler, M.A., of Liversedge, president, in the chair. The minutes of the annual meeting having been confirmed, the secretary read the minutes of the Council, the president pointing out that the adoption of these minutes involved the change of the Society's name. A long debate ensued upon this point, but ultimately the Council minutes were confirmed by a large majority, and the name consequently changed to "Yorkshire Naturalists' Union." Three Societies—the Huddersfield Scientific Club, the Leeds Conchological Club, and the Sheffield Naturalists' Club—were then admitted into the Union. It was then resolved that the Whit-Monday excursion be held at Wetherby instead of Sherburn.—The president then delivered his inaugural address, in which he pointed out the benefits to be derived from the study of natural history, and urged upon the members the desirability of some one taking up the study of certain hitherto-neglected groups of animals and plants, and also suggested to the Societies the desirability of providing elementary instruction in science for the benefit of younger and less experienced members.—Dr. Parsons reiterated the president's advice with respect to the working of the "neglected orders," and pointed out the necessity of obtaining *perfect* specimens and of making accurate memoranda of localities and specimens brought to the meetings.—Mr. Talbot pointed out that the chief obstacle to the working out of neglected orders was the scarcity or expense of the necessary text-books, and the immense extent and discursive character of the literature of such subjects.—The president was thanked for his address, and it was also resolved that it be, with his consent, printed and distributed among the members.—The officers of sections were then called upon to report the proceedings of the day. Mr. Lister, secretary of the Vertebrate Section, reported that the missel-thrush (nest and eggs), song thrush (do.), blackbird (do.), redbreast (do., *sitting*), great tit, blue tit (building), cole tit, marsh tit, pied wagtail, meadow pipit, tree sparrow, linnet, lesser redpoll, jackdaw, magpie, wren, ringdove (abundant), peewit, a pair of golden plovers, moorhen, kestrel, and all the more common species, such as chaffinch, greenfinch, yellow bunting, &c., &c., had been observed amongst the resident birds, while of winter visitants still here were noticed fieldfares (hundreds in one flock), redwings (not so numerous as the fieldfares) and several mountain finches. One spring migrant, the chiffchaff, was noted, several individuals having been seen and heard during the day by H. Lunn and Wm. Talbot. Amongst the other notes given to the section were: the arrival of the wheatear, near Wakefield, by W. Talbot, and at Greetland Moor, Halifax, March 24, by C. C. Hanson; and the occurrence of the stonechat (*Saxicola rubicola*) on Adel Moor, near Leeds, March 18, noted by Mr. John Grassham. Mr. William Nelson, president of the Conchological Section, reported that in spite of the unfavourable weather and

early season 54 species of molluscs (including eight varieties) had been collected during the day, the most noteworthy being single specimens of *Limax laevis* and *Helix rotundata*, var. *Turtoni*; also that a specimen of *Productus horridus*—a brachiopod fossil from the magnesian limestone—had been collected and brought before the section.—Mr. Wm. Prest, president of the Entomological Section, reported that the earliness of the season prevented much entomological work, the only lepidoptera observed being *Anisopteryx aescularia*, *Hybernia progemmaria*, *Diurnea fagella* (all forms), *Depressaria aplenella*, *D. assimilella*, *D. oscilella*, and larvæ of *Odonestes potatoria*, *Xylophasia rurea*, and *Mania typica*. The beetles taken included *Anchomenus prasinus*, *Pterostichus melanarius*, *P. strenuus*, *Amara communis*, *Bembidium æneum*, *Hyphydrus variegatus*, *Hydroporus decoratus*, and *Aphodius fimetarius*; all named by Mr. H. Crowther, of Leeds. In hymenoptera the common large wood ant (*Formica rufa*) was observed abundantly in Weldon Wood, Fryston Park, where it was introduced some years ago in order to feed pheasants; the species is, however, common in all old woods, it being a true British native, and not a foreign importation.—Dr. Parsons, secretary of the Botanical Section, reported that 20 flowering plants had been observed, the most noteworthy being: *Viola hirta* (fl.), Knottingley; *Sanguisorba officinalis*, Pontefract; *Smyrnium Olusatrum*, Pontefract castle; *Centranthus rubra*, Knottingley; *Inula Conyza*, Pontefract; and *Daphne Laureola* (fl.), Weldon Wood, Fryston;—20 mosses, viz:—*Tortula fallax* (fr.), *Grimmia pulvinata* (fr.), *Zygodon viridissimus*, *Bryum cæspititium* (fr.), *B. argenteum*, *Fissidens bryoides* (fr.), *Leskeia sericea*, *Hypnum elegans*, *H. molluscum*, *H. cuspidatum*, *H. purum*, *H. cupressiforme*, *H. squarrosum*, *H. striatum*, *H. confertum*, *H. serpens* (fr.), and *H. prælongum*;—one lichen, *Physcia parietina* (fr.);—one fungus, *Agaricus fascicularis*;—and two algæ, *Confervaria* (*bombycinæ*?) and a species of *Vaucheria*, not identifiable in the absence of fruit.—Mr. Joseph Tindall, of Huddersfield, reported the proceedings of the Geological Section, stating that the only fossils exhibited were very common ones, except one collected by Dr. Parsons—a *Sternbergia*. Arranging them stratigraphically, the list would be as follows:—Coalmeasure fossils: *Sternbergia*, *Anthracosia*, *Stigmaria*, *Dadoxylon*; Permian fossils: *Axinus obscurus*, *A. Sclotheimia*. *Sternbergia* and *Dadoxylon* are different parts of the same plant, one being the pith and the other the bark.—The sections visited form the junction of the coal measures and permian strata; the most remarkable feature of the sections is, that the coal measure strata rise to the east in this locality, and are overlaid by permian strata resting unconformably on the outcrop of coal. The section shews a very remarkable fault where the coal-measures are cut off suddenly and thrown down below the limestone. The meeting closed with votes of thanks, including one congratulating Mr. Joseph Wainwright, F.L.S., on his safe return from his travels in the east of Europe, &c.—Wm. DENISON ROEBUCK, Sec.

Diary.—Meetings of Societies.

- May 1. Bishop Auckland Naturalists'. Liversedge Naturalists'.
Leeds Naturalists' Club, &c., 8 p.m.
- ,, 5. Mirfield Naturalists'. Huddersfield Naturalists'. 8 p.m.
Goole Scientific—Excursion to Welton Dale.
- ,, 8. Leeds Naturalists' Club, &c.—Paper by Henry Pocklington,
F.R.M.S.
- ,, 9. York and District Naturalists' Field Club. Selby Natu-
ralists'—Excursion to Riccall Common.
- ,, 11. Huddersfield Scientific Club. 8 p.m.
- ,, 12. Huddersfield Scientific Club—Excursion to Hillhouse to
examine Gravel Bed : Leader, Mr. Ed. Brooke, F.G.S.
- ,, 15. Leeds Naturalists' Club, &c.
- ,, 19. North Staffordshire Naturalists', &c.—Excursion to Lyme
Park : Leader, Mr. Sainter.
- ,, 21. Yorkshire Naturalists' Union—Excursion to Wetherby for
the Cowthorpe Oak : Leader, Mr. J. S. Wesley, M.B.
- Huddersfield Naturalists'.
- ,, 22. Leeds Naturalists' Club, &c.
- ,, 29. Leeds Naturalists' Club, &c.—Paper : "Evolution, and
the Vegetable Kingdom."—Thomas Hick, B.A., B.Sc.
- ,, 30. Selby Naturalists'—Excursion to Holme, on Spalding Moss.
-

EXCHANGE, &c.

EXCHANGE.—I will endeavour to make a return for any of the following micro-larvae:—From shoots of raspberry; heads of cotton-grass; stems of thistle and knapweed; heads of teasel; shoots of yarrow; seeds of rush, &c.—S. L. MOSLEY, Primrose Hill, Huddersfield.

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ON THE FAUNA AND FLORA OF LEBANON AND LOWER SYRIA,

IN CONNECTION WITH THEIR CLIMATAL CONDITIONS.

BY EDWARD ATKINSON, F.L.S., F.Z.S.

Honorary Curator in Zoology to the Leeds Philosophical and Literary Society.

(Read before the Leeds Naturalists' Association, October 24, 1876.)

PHYSICAL GEOGRAPHY OF THE COUNTRY.

The two parallel ranges of Lebanon and Anti-Lebanon may be said roughly to divide the land longitudinally into plains and highlands.

The first, rising at the angle of the Mediterranean, near the roots of the Taurus range, runs nearly north and south along its eastern shore in an almost unbroken chain through nearly three degrees of latitude, receding at some points to form broad maritime plains, and sending out spurs at two or three points which stretch seawards, and form rocky headlands.

The part of this range which lies in North Syria and extends to the confines of Palestine, is generically called Lebanon, its highest peaks being Dhor el Khodib (10,050) capped with all but perpetual snow, and only about 1000 feet above the famed cedar grove; and Jebel Sunnin (8500) thirty miles further south. Shortly after attaining these heights the Lebanon melts away, expanding in breadth as it diminishes in height, and forming by its many spurs the rugged hill-country of North Galilee, cleft by the deep fissure of the river Leontes (Litany), which sweeps suddenly westward and enters the sea to the north of Tyre. Henceforward the mountain masses which form the backbone of Palestine proper can scarcely be called a range, for their spurs branching in various directions, and interrupted by occasional transverse valleys and plains (notably the great plain of Esdraelon and valley of Shechem) break its continuity. Still they start up again and constitute the highlands of Samaria and Judea, and the watershed between the Mediterranean and the Jordan valley.

This hill-country reaches, in its higher elevation, an average height of 2500 above the sea level (Mount Ebal 2700, Gerizim 2650, Jerusalem 2610, Mount Olivet 2724, Bethlehem 2704, Hebron 3029 feet).

South of Hebron the hills sink and expand into a region of rolling downs and broad shallow valleys, more suited for pasture than cultivation. This fades into the desert of Paran, a vast limestone plateau gradually rising from Beersheba (1100) to a second plateau of 2520 feet, and culminates in Jebel Tîh (4654). Then a narrow sandy desert intervenes, and the granite peaks of Sinai suddenly rise to 9500 feet, and terminate at the fork of the Red Sea.

2. The eastern range, which runs parallel to this from north to south is called (in Upper Syria) the Anti-Lebanon ; for the most part it is of inferior elevation to the Lebanon. It gives rise to four rivers—the Orontes, Abana, Pharpar, and Jordan—all of considerable volume, but of which one only is destined to reach the sea. This chain is divided from Lebanon by the broad valley of El Bukaa (Cœlesyria), beyond the south extremity of which it attains its greatest elevation in Schel Shiekl (Hermon, 9800), whose dome-shaped snow-capped summit is visible for 120 miles. From hence the range, suddenly lowered to an altitude of about 2000 feet, trends to south-east and bounds the Hauran, then turning southward melts into a vast rugged region, unmarked by any peaks, but furrowed and fissured by endless hidden ravines of black basaltic rock. This is Bashan (the Lejah). This range is prolonged in its parallel course less diffusely than the western chain, and forms the trans-Jordanic boundary which everywhere limits the eastern horizon to the traveller in Palestine—the long straight line of the mountains of Ajlun, Gilead, and Moab. The range has rather the appearance of the wall of an elevated plateau which slopes away eastward. The highest points are Jebel Ajlun (6500) pine-clad and often capped with snow ; Jebel Osha, the highest point of Mount Gilead (5000) ; Nebo, in Moab (4600). South of Moab the chain reappears in Mount Hor (5300), and thence is continued as a low range to the Gulf of Akabah, on the Red Sea, fringing the shore opposite to the Sinai mountains.

But it is between the two parallel chains of mountains we have traced that the most extraordinary physical feature of the country is found—the “Ghor” of Jordan (compare *Gordale*). This is no mere waterworn valley, but a deep fissure, or chink, ploughed deep down (Tristram) into the bowels of the earth, and separating Palestine from the country eastward of Jordan. This singular river, rising in Anti-Lebanon, seems beset with mystery from its commencement to its termination. Fed by the snows of Hermon, it is destined to be consumed by evaporation in the torrid basin of the Dead Sea. Its

bed deepens steadily from the first. Halting in L. Huleh it receives many affluents, then descends rapidly to the Sea of Galilee; then breaking from the south extremity (twelve miles from its entrance) it rushes on, deepening still as it proceeds, and in so tortuous a course that it increases a distance of 60 miles to 200, until it reaches the Dead Sea—a mountain-pent lake 42 miles long and 12 to 16 wide, 1292 feet below the level of the sea, *and the deepest depression on the earth's surface.*

This Ghor it is which has caused the wondrous variety of climate—and, hence, the singular contrasts in the fauna and flora, as well as in the scenery and the cultivated products of the country.

From the physical features of the country and the range of altitudes, it will be evident that the climate varies in every district. Even in the deserts of the south the greatest extremes of temperature are experienced. Thus, in February, at Beersheba the thermometer stood at daybreak at 24° F. (the mean night temperature for a week being 31°), while the mean at noon was 72°. In summer the mean temperature by night would be 70°, and that by day 85° to 90°.

At Jerusalem, though elevated 2600 feet the climate is almost as mild as Gibraltar. It is in the same isothermal line with California and Florida, but free from their extremes of temperature. The mean for day in January is 49°4, February 53°7, April 61°, May 73°. July 79°. This month has the maximum average temperature, but there is not much diminution for three months after, no rain falling before the middle of October. The mean temperature for November is 63°. The mean for the year in 1844 was 62°6 (Glaisher) and that for four years (1868–71) 66°5 (Dr. Barclay). Snow is rare and transient, frost is very rare.

This may be taken as an approximate estimate of the temperature of Central Palestine, where the palm flourishes and pomegranates ripen. The hill sides are clothed with the vine, olive and fig.

In the maritime plains the averages are very much higher, and the crops there are about a month earlier. Frost and snow are here unknown. The orange groves of Jaffa and Sidon are the most luxuriant in the world. Here the banana and the date palm ripen their fruits.

In the valley of the Jordan the climate is still more tropical. On the shores of the Sea of Galilee (650 feet below the sea level) the heat of summer is intense, and the depression of the valley causes a sudden change in the products. Here the date-palm grows wild, and

the papyrus-reed attains a height of 12 to 16 feet. Even on the hills, 450 feet above the lake, from March 17 to April 5 the mean temperature for 24 hours was 63° F. In May the average for 24 hours was 73°, and for the day only 83°, while the maximum was 90°.

As we descend the valley of Jordan the climate steadily increases in temperature, till we reach the lowest depression (nearly 1300 feet) at the Dead Sea. Here in January the lowest mean temperature of the night was 47°, and of the day 67°. In April the temperature in the shade at noon was 105°, and in summer the heat is so intense that even naked Arabs of the Safieh are compelled to leave the valley for the highlands. In October, when I slept two nights in the open at Engedi, the thermometer stood at 70° to 72° at midnight, and over 90° in the day.

Very little rain falls here, but the evaporation of the Dead Sea keeps the atmosphere always moist.

The oases—five or six in number on the shores of this lake—are quite tropical in character. At Engedi the thickets are composed of the *Lawsonia inermis*, the henna of India, and the *camphire* of the Book of Canticles; the osher tree, the apple of Sodom, (*Calotropis procera*, N.O. *Asclepiadaceæ*), *Acacia vera*, with its gum and its parasitic *Loranthus*; *Moringa aptera*, *Elœagnus (oleaster)*, *Astragalus*, the *Salvadora persica*, and many other products of the torrid zone.

The birds, too, of these oases are peculiar, many of them not hitherto found in any other part of the world—others Indian, or from Equatorial Africa. “Besides the common turtle-dove which visits all Syria in summer, another large species, the Indian collared turtle (*Turtur risorius*) lives here through the year. A night-jar, a grackle, and a sparrow, not found elsewhere, live here permanently; and a *Nectarinia*—a minute sun-bird resembling a humming-bird—flits among the shrubs in great numbers. The butterflies, too, are different here, but are allied to species found no nearer than Nubia and Abyssinia, and some East Indian” (Tristram).

Among mammals (which are not abundant, but characteristic), those we meet with most frequently in this district are the Beden or Syrian ibex (*Capra Beden*), the *Hyrax Syriacus*, or coney; the *Hyœna striata*, which is common to all Syria, but its former frequency here is recorded in the name of the valley of Zeboim (*i.e.* of *Hyœnas*); the *Jerboas*, two species of *Dipus*, and the porcupine.

No fish can live in the Dead Sea, but the little streams which rise in the rocky cliffs and run a short course of 300 yards to a quarter of

a mile, abound in small species—*e.g.* two *Cyprinoids* (*C. cypris* and *C. sophia*), a *Cobitis*, and one species which attains a length of six inches—the *Chromis nilotica* of Hasselquist. Thus all departments of nature bear testimony to the tropical character of this little-known but most interesting region—a startling contrast to all around it.

If we now retrace our steps northwards to the Lebanon and Mount Hermon, passing by the highlands of Central Palestine, where the fauna and flora are of an intermediate type—where the intervening valleys wave with crops of barley, wheat, millet, sesame, pulse, and tobacco—and where the terraced limestone hills are covered with vineyards, oliveyards, and fig-gardens—where the fauna is intermediate between that of South Europe and Western Asia, and includes the fox, jackal, Egyptian lynx (*Felis Chaus*), and, in the forest of Carmel, the chetah (*F. jubata*)—we come to a climate of a totally different character, and conditions which favour strikingly different products.

"At Rasheiya," says Tristram—which is on the shoulder of Hermon (about 5000ft.)—in June, "the morning air was keen and frosty. We were now, for the first time since we had been in the country, above, the line of the olive: whose place was supplied by the walnut, apricot, fig, and almond. The dew of Hermon was more copious than we had ever experienced, everything was drenched, and our tents were small protection. Explanation: Hot air coming up from the Ghor is arrested by Hermon and condensed."

From the commencement of the real ascent, vineyards take the place of cornfields, and the pear-tree of the fig.

Here Tristram collected three new birds: a beautiful little finch allied to our canary (Himalayan species)—the *Serinus aurifrons*; a new warbler (*Hippolais upcheri*); and a beautiful and remarkable bird (*Bessonornis albogula*). Higher up, above the vineyards, are moraines—large heaps of rocky fragments, not waterworn or rounded, which occur at the mouths of nullahs or short ravines, and which are like the moraines in Switzerland,—probably the deposits of ancient glaciers. These dwindled to a bare rocky ravine, whose sides bore clear evidence of glacial action, for the ice-scratches could be plainly traced on the rounded face of many a rock shoulder. Here the surface was dotted by dwarf shrubs of *Rosa spinosissima*, *Prunus syriacus*—a most exquisite little shrub—and a lovely pink *Astragalus*, all cropped short by the goats. The ascent became more steep. The hard crystalline limestone much upheaved, and dipped almost vertically S.W. Glacial action was visible everywhere. The summit was reached

after five hours. Near the top (the last few hundred feet being more or less covered with snow) a little short-tailed marmot (n. sp.) was obtained ; the alpine yellow-billed chough (*Pyrrhocorax alpinus*) in small bands hovered near ; the raven and the common swift incessantly wheeled, croaked, and screamed around ; and the griffin and great Egyptian vulture, with an eagle or two, soared overhead.

The snow was (June) covered with tracks of bears (*Ursus Syriacus*) : but though they had recently been here, they did not put in an appearance on this occasion. Of small birds, the common wheatear (*Saxicola oenanthe*), the English brown linnet (*Linota cannabina*), the snow-finches (*Montifringilla nivalis*), and Persian horned-lark (*Oticoris penicillata*) are found. Here, then, in this isolated arctic patch, were the alpine chough, and just below two English winter birds.

The flora here, on the summit, was equally characteristic of alpine heights—a dwarf, clumpy growth of scrub, with great variety of lovely flowers scattered among them, a dwarf iris (blue), a crocus, three species of *Androsace*, a *Ranunculus*, a *Fritillaria*, a *Primula*, *Draba villosa* and *D. vesicaria*, and a rue. But there were no mosses nor saxifrages. On Lebanon, at 5000ft. and upwards, the juniper, the pine and cedar take the place of the ilex and the terebinth of the Judean and Samaritan highlands.

The coincidence of finding all these boreal forms of plants and animals together, with such undoubted traces of glacial action, seems not only to bear out the evidence gathered from the discovery of remains of extinct northern forms of animals in the breccia of caves in Lebanon—evidence, namely, of the occurrence of a period of great cold subsequent to the later pleiocene age (which is now universally admitted)—but it further seems to suggest, by contrast with the tropical fauna and flora of the Dead Sea basin that, by a parallel chain of evidence a pre-glacial period of great heat had preceded, in which forms of life now limited to the tropics had penetrated much further north than they do now. When, therefore, the transition from a tropical to a boreal climate supervened, there would be a renewal of the tide of migration, the only survivors of the miocene heat finding a suitable retreat in the deep depressions of the Jordan valley. When again the glacial cold was modified, the higher mountains would be left tenanted by those northern forms of birds and animals, and those sub-arctic plants which were fitted to survive in that situation, and this is exactly what we find on Lebanon and Hermon.

Among the curiosities of natural history in Palestine, I may mention the singular fact of the survival of the crocodile in one of the rivers of West Palestine—the river Zerka,—which rises near Samaria and flows through the plain of Sharon to the Mediterranean. It is mentioned as existing there by Pliny and Strabo, who call the river by the name of *Flumen Crocodilus*. It was also mentioned by Pocock in the last century, but had not been seen or recently heard of by travellers until a few years ago, when a large specimen was captured by the local Arabs, who seem to have been long familiar with its presence.

The fish of the Lake of Galilee and the Jordan are mostly African species—*Chromis nilotica*, *Clarias macracanthus*, and a large siluroid, the *Coracine*, or sheat-fish, which are all, with seven or eight other species, excessively abundant.

A LIST OF THE LAND AND FRESH-WATER SHELLS

FOUND IN THE
NEIGHBOURHOOD OF HUDDERSFIELD.

(Concluded.)

BY JOSEPH WHITWHAM.

TERRESTRIAL.

Helix hispida, L. Plentiful in several localities.

„ „ var. *subrufa*. Rare, Wakefield-road side.

„ „ var. *albida*. Wakefield-road side. I have only found one specimen of this variety.

„ „ var. *subglobosa*. Very rare, Wakefield-road side.

H. fusca, Mont. Rare, Roydhouse Wood ; have also found several young specimens in the Hey Wood.

H. caperata, Mont. Rare at Woodsome.

H. rotundata, Mull. Common.

„ var. *minor*. Rare at Elland.

„ var. *pyramidalis*. Rare at Elland.

„ var. *Turtoni*, Fleming. Rare at Elland.

„ var. *alba*, Moq. Tan. Rare at Elland and at Golcar.

H. pygmea, Drap. Common in Roydhouse Wood and Hey Wood.

H. pulchella, Mull. This is a limestone species. I found a specimen at Dalton a short time since, but am very doubtful of its being a denizen.

Bulimus obscurus, Mull. I have found several specimens of this at Elland.

Pupa umbilicata, Drap. Common at Elland.

„ „ var. *edentula*. Rare at Elland.

„ „ var. *alba*. do.

Vertigo pygmea, Drap. Rather plentiful in Roydhouse and Hey Woods.

V. substriata, Jeffr. Rare in Roydhouse and Hey Woods.

V. edentula, Drap. Rare in Grimescar, Roydhouse and Hey Woods.

Clausilia rugosa, Drap. Rare in Daffer Wood.

Cochlicopa tridens, Pulteney. Rare in Hey Wood.

C. lubrica, Mull. Common.

„ var. *lubricoides*, Fer. Rare, Elland.

Carychium minimum, Mull. Common.

Acme lineata, Drap. Rare, Roydhouse Wood.

I have specimens of all the foregoing in my cabinet, with date and exact locality. I must thank my friend Mr. John Varley for my first introduction to conchology, and for much valuable assistance and information, also Mr. Lister Peace for showing me the locality of *Zonites glaber*.

Denby Place, Marsh,
Huddersfield, March, 1877.

ADDENDA—*Planorbis albus*. Mill-dam, Deighton.

Zonites fulvus, white crystalline variety. Royd House Wood.

ERRATA.—p. 151, for T. Whitwam *read* Joseph Whitwam. p. 153, line 3, for *viridescenti* *read* *viridescenta-alba*.

Short Notes and Queries.

Rhagium bifasciatum IN YORKSHIRE.—Happening to meet with this large and conspicuous longicorn beetle in some numbers the other day, I venture, though I am not a coleopterist, to place on record my experience with it as a slight contribution to the working out of the distribution of our Yorkshire beetles. I first met with the insect in the middle of September, 1869, when I found an old tree infested with it in a field at Pannal, near Harrogate. I extracted with a gouge a number of specimens

imagos, pupæ, and larvæ ; in a few days after two of my pupæ changed to the perfect state. On the 23rd of April, 1871, Messrs. Thos. Rhodes and W. H. Taylor got it plentifully in two decayed pine trees in Scotland Wood, Meanwood Valley, just within the northern boundary of Leeds borough : they found the larvæ, but no pupæ. On the 29th I visited the spot, and extracted two males and one female, the males being smallest. Among the specimens from this locality there was some variation in respect of the size of the transverse band on the elytra. I again met with the insect somewhat commonly in decayed pine-stumps in woods at Scarcroft, near Wetherby, on the 14th of May, 1877. The larvæ were abundant, of various sizes, but no pupæ were found. The perfect beetles were almost as common as the larvæ. The beetle occurs plentifully where it is found, and it would appear to be a common one in this county. In the case of the "neglected orders," it seems to me most desirable, when the species can be accurately determined, that they should be placed on record from time to time, in order to accumulate material for the working out of the "areas" of the species.—WM. DENISON ROEBUCK, Leeds, May 15th.

SALISBURY PLANTS.—When at Salisbury, in the early part of April, I came upon a large patch of albinos of *Lamium purpureum*. I never saw beds of this plant in such profusion before ; but the white varieties were confined to one spot. The flowers were of snowy whiteness, and the leaves a light green, without a trace of the normal bronze colour. Curiously enough, I received a letter from Dr. Wesley, of Wetherby, just at this time, telling me of a similar discovery made by himself. Having looked through a list of the plants recorded in "Science Gossip," in which albinism has been observed, and not noticing *Lamium purpureum* amongst them, I am led to suppose it is not of very frequent occurrence ; I should, therefore, be glad to hear from others concerning it, and whether these albinos are perpetuated. Amongst some of the plants I found in my rambles, I may mention the somewhat local *Myosotis collina*, *Saxifraga hypnoides*, the sickly-smelling *Adoxa moschatellina*, and *Veronica Buxbaumii*. I was told the other day a very good characteristic by which to distinguish this species from *agrestis*, is that in the former the lower petal is blue, whilst in the latter it is always white. Bentham does not mention this ; that which he gives, however, of the longer pedicels is an equally good distinction. The dark purple whorls of *Salvia verbenaca* were appearing in many places, and the singular *Paris quadrifolia* might be seen in a small wood or plantation a short distance from the town. *Sympytum officinale* was luxuriant on moist banks, on some of which I found larvæ of *Callimorpha dominula* feeding. All the plants I examined were white-flowered. At Alresford (my former residence) the purple colour prevailed : indeed I do not remember ever having seen the white variety there at all. The plants with purple flowers seem to prefer situations higher and not so damp as the others.—JOSEPH ANDERSON, JUN., Chichester, Sussex.

Rainfall for April.

HUDDERSFIELD (Dalton, 250 feet).—During April 2·74 inches of rain fell, on 19 days, making a total for the first four months of 1877 of 13·49 inches. The average for the last eleven years is 2·07 inches in 15 days, and 10·12 inches from January to April inclusive. The heaviest day's rain was 0·67 on the 22nd.—J. W. ROBSON.

WAKEFIELD.—The total fall for this month was 3·20 inches on 14 days. The greatest quantity gauged in 24 hours was on the 22nd, ·82 inches. An “inch of rain” means a gallon of water spread over a surface of nearly two square feet, or a fall of about 100 tons upon an acre.—FREDK. HILL.

BARNESLEY (350 feet).—Total, 3·47 on 18 days ; most on the 22nd—·96 inches.—Wentworth Castle (600 feet) : 4·07 inches on 15 days ; greatest fall on the 22nd—1·28 inches.—Ingbirchworth Waterworks (853 feet) : 3·67 on 17 days ; greatest fall, ·95 inches, April 22nd.—T. LISTER.

LEEDS (137 feet above sea, gauge 46 feet above ground).—Total rainfall, 3·510 inches. Heaviest day's fall was on the 9th, ·640 inches ; on the 22nd, ·600, on the 4th, ·520, and on the 21st, ·410. Rain fell on 16 days, and a little snow on the 29th. Thunderstorms on the 4th and 23rd. The mean or adopted reading for the month of the barometer being 29·642 inches ; the highest being on the 20th, 30·132, and the lowest on the 4th, 29·010, showing a monthly range of 1·122 inches.—H. CROWTHER.

GOOLE.—Rainfall 2·28 inches ; wet days, 14. Temperature : maximum 58° F. on the 4th ; minimum 31° on the 12th and 20th ; mean 43·8° ; mean daily range, 11·7°.—H. FRANKLIN PARSONS.

Reports of Societies.

BRIGHOUSE AND RASTRICK NATURALISTS' SOCIETY.—Meeting April 21st.—Owing to the afternoon having been very wet, very few botanical specimens had been gathered. They included *Lathraea squamaria*, *Ranunculus aquatilis*, *R. auricomus*, *Viola canina*, all in bloom. Mr. W. Walker presented a specimen of salamander and two specimens of the green lizard to the museum.

MEETING May 14th, the president, Mr. E. Whiteley, in the chair.—Ornithology : Mr. James Haigh reported the wheat-ear (*Saxicola oenanthe*) as seen by him on the 7th inst., and the whinchat (*S. rubetra*) on the 12th inst., at Toothill Bank. The cuckoo (*Cuculus canorus*) was heard by several members on the 6th inst., in the Walter Clough Valley ; the magpie (*Pica caudata*) is this year more numerous in that locality than usual. The corn-crake (*Crex porzana*) was heard by Mr. G. B. Wentworth on the 12th inst.—Conchology : 16 species of marine shells were

exhibited, amongst which were some fine specimens of *Aporrhais*, *Cypræa*, *Murex*, and *Cymba*. Specimens of the following land shells were exhibited by Mr. G. Lister:—*Bulimus acutus*, *B. montana*, *B. obscurus*, *Clausilia biplicata*, *C. Rolphii*, *C. perversa*, *C. laminata*, *Azeca tridens*, *Zua sub-cylindrica*.—Botany: A number of plants and mosses were laid upon the table, which had been received per train from Mr. J. Sykes, Blackpool, and had been gathered by him in that locality; amongst them were the following in bloom:—*Myosotis palustris*, *Fumaria officinalis*, *Geranium molle*, *Viola lutea*, *Euphorbia Paralias*, *Fedia olitoria*, *Salix repens*. The following local plants in bloom were exhibited by several members:—*Pedicularis vulgaris*, *Fedia olitoria*, *Melica uniflora*, *Ranunculus bulbosus*, *Heracleum Sphondylium*, &c.—Geology: Mr. G. Lister exhibited a jaw of a carboniferous fish recently found by him in the Low Moor coal measures.—A. CLARKE, Sec.

GOOLE SCIENTIFIC SOCIETY.—An excursion was made on May 5th to Brough and Welton Dale. About half-a-mile north of Brough Station, by the side of the road to South Cave, a quarry of inferior oolite was examined, in which fossils were plentiful; the following were the principal species found:—*Rhynchonella spinosa*, very abundant, and with the hair-like spines well preserved, *Terebratula spinosa*, *Pecten demissus*, and another species resembling *P. annulatus*, *Lima duplicata*, and *L. gigantea* (? small form), a large *Pinna*, perhaps *P. mitis*, and *Modiola*. (?) Close by was a gravel pit, in which a gravel composed of angular fragments of local rocks, in beds with a strong dip to the east, was seen to rest unconformably on horizontal strata of sand and laminated clay. At a higher level, towards Elloughton, was seen a drift gravel composed of rounded pebbles of carboniferous sandstone and millstone grit, resembling that found at about the same level at Heck. The party then proceeded to Welton Dale. This is a picturesquely wooded valley winding up among the Wolds; the upper part, like so many valleys in chalk districts, is without a trace of water; but lower down in a dark woody dell are a number of fine springs of pure deep blue pellucid water; these springs are seen to issue from the point where the base of the white chalk rests on a bed of red chalk, like that at Speeton. Owing to the backwardness of the season, not many plants were in flower: the dry, cold weather, too, was unfavourable for finding mollusks and cryptogamic plants, but the result of the afternoon's work in these departments was as follows:—Mollusca: 18 species, including *Helix virgata*, *H. ericetorum*, *H. pulchella*, *Zonites nitidulus*, *Clausilia biplicata*, *C. laminata*, *Vitrina pellucida* (plentiful), *Zua lubrica*, *Bulimus obscurus*, and *Ancylus fluviatilis*. Flowering plants, 84 species, including *Helianthemum vulgare*, *Viola hirta*, *Cerastium arvense*, *Spergularia rubra*, *Prunus Padus*, *Poterium Sanguisorba*, *Ribes rubrum*, *Saxifraga granulata*, *Silaus pratensis*, *Viburnum Lantana*, *Scabiosa Columbaria*, *Carlina vulgaris*, *Lamium incisum*, and *Listera ovata*. Mosses and hepaticæ, 35 species, among them being *Anacalypta lanceolata* (fr.).

Tortula unguiculata (fr.), *T. fallax* (fr.), *T. laevipila*, *Grimmia apocarpa* (fr.), *Bryum carneum*, *Fissidens taxifolius*, *Hypnum triquetrum*, *molluscum*, *striatum*, *filicinum*, *splendens*, *ruscifolium*, and *lutescens*, and *Plagiochila asplenoides*. Eight lichens, among them *Ramalina fastigiata* (fr.), and *Physcia pulverulenta*. Two algæ, *Batrachospermum moniliforme*, and *Coccocchloris rivularis*; and one fungus, *Morchella esculenta*.—H. FRANKLIN PARSONS, Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting May 11th, Mr. C. P. Hobkirk, president, in the chair.—Arrangements having been made for the excursion to Hillhouse and Deighton on the following day, Mr. Geo. Brook recorded the occurrence of the common tern in the town, flying about the river Colne that day. Mr. G. T. Porritt exhibited larvæ of *Plusia V-aureum*. Mr. Geo. Brook, bred specimens of *Iodis vernaria* and *Ligdia adustata*. Mr. S. L. Mosley, butterflies mounted entire for the oxy-hydrogen microscope. The meeting closed with a conversation, on the curious fact of sparrows eating the yellow flowered crocuses, and totally refusing the purple flowered ones; a subject being now so energetically discussed in "Nature."

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Monthly meeting 30th April, in Brown's Museum, Liverpool, Mr. Capper, the president, in the chair.—Mr. Nicholas Cooke, the vice-president, read a paper respecting the locality of *Nyssia zonaria*. The meeting then formed into a conversazione, and several of the members exhibited objects of interest.—W. H. MOUNTFIELD, Hon. Sec.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—243rd meeting, April 17th, Mr. Wm. Nelson, V.P., in the chair.—Mr. W. B. Turner showed with the microscope a species of discoid diatom (marine) from Weymouth, much resembling a small *Heliopeleta*. Mr. S. Scholefield, *Helleborus viridis* from Kiddal Lane, near Leeds. Mr. Charles Smethurst, shells, eggs, and larvæ, also male specimens of *Pieris brassica*, having certain portions of the wing denuded of scales. Mr. James R. Murdoch showed a number of West Indian shells; Mr. John W. Taylor *Helix hæmastoma* from Ceylon, remarking on its great variability; *H. Barbadensis*, West Indies, and *H. testudinalis*, Madeira, showing the connection of the two faunas; *H. planata*, var. *erythostoma* from Morocco, with remarks on its serving as food for certain species of carabideous beetles; and several beautifully-marked *Helices* from the Philippine Islands; Mr. Wm. Nelson the palate of *Cyclostoma elegans*, and an example of *Helix hispida*, var. *albida*, from Seacroft. A very large number of shells, collected at the Union meeting at Pontefract, were shown by Messrs. W. Nelson, H. Crowther, and H. Pollard.

244TH MEETING, April 24th, Mr. Henry Pocklington, F.R.M.S., V.P., in the chair.—Mr. John Grassham noted that a green woodpecker was seen by Mr. Matthew Taylor, near Arthington, on the 15th of April.

Mr. W. H. Hay showed a large bird supposed to be from Norway, which was considered to be an immature example of the great black-backed gull ; Mr. John Grassham showed a number of lepidoptera, and gave an interesting account of the introduction into Canada in 1859, and subsequent dispersal in North America, of the small garden white butterfly (*Pieris rapæ*) ; Mr. Henry Pollard showed a number of shells collected at Ardsley, also a curiously malformed example of *Helix nemoralis*, which appeared to have met with an accident in early youth ; Mr. Benj. Saynor (microscope) section of stem of *Begonia*, and section of coal from Low Moor Bed, Osmondthorpe pits, showing vegetable structure. He described his method of grinding coal fossils by a novel process of imbedding in plaster of Paris. Mr. J. S. Beat showed stalagmite, carbonate of lime, a formation of 100 years from an old lead mine at Matlock, in Derbyshire ; Mr. S. Scholefield showed mica-quartz rock from New Jersey State, U.S.A. ; Mr. Washington Teasdale spoke upon *Lissajou's curves*.

245TH MEETING, May 1st, Mr. Henry Pocklington, F.R.M.S., in the chair.—Mr. Washington Teasdale exhibited a flowering branch of almond and made some general remarks on the influence of smoke on plants, and climatology in its bearings on the acclimatization of plants. He also exhibited a small micrometer gauge, graduated from 1-8000th to 1-20th of an inch, which was of simple construction, based on the principle of lever of contact. Mr. Grassham showed *Antheraea Pernyii*, the oak-feeding silk-moth from North China, and a series of the British sphinges. Mr. Henry Pollard brought specimens of *Helix nemoralis*. taken near Woodlesford, showing the great amount of variability occasionally found in one district. Mr. W. H. Hay showed the eggs of twelve species of birds, some of them rare.

246TH MEETING, May 8th, Mr. F. Greenwood, V.P., in the chair.—Mr. Henry Pocklington, F.R.M.S., gave the first of two lectures on "Flame," in which, after having referred to the old myths respecting the origin and nature of fire, he proceeded to describe the present theories of heat, combustion, and light, and illustrated his remarks by various striking experiments.

247TH MEETING, May 15th, Mr. W. Nelson, V.P., in the chair.—Mr. Langley Kitching exhibited a living specimen of a curious horned reptile from Texas ; Mr. J. R. Murdoch the pensile nest of one of the African weaver birds, and seeds of exotic plants ; Mr. Charles Smethurst showed *Tephrosia biundularia*, *Paris quadrifolia*, and *Orchis mascula*, from Bishop Wood ; Mr. Washington Teasdale, a very convenient form of demonstrating microscope for class use ; Mr. Wm. Denison Roebuck, living beetles and larvæ of *Rhagium bifasciatum*, from Scarcroft (see note at p. 168). Mr. B. Saynor showed with the microscope a most interesting subject, the circulation in a desmid, *Closterium striolatum* ; Mr. James Pickles, several cases of insects in splendid condition, including *Dicranura*

furcula, *Ptilophora plumigera*, *Notodonta dromedarius*, *Cossus ligniperda*, *Euthemonia russula*, *Sirex gigas*, *S. juvencus*, and many others.—WM. DENISON ROEBUCK, Secretary.

MIDDLESTOWN NATURALISTS' SOCIETY.—Meeting 8th May.—The Rev. A. T. Pullin gave a most interesting lecture on “The Fertilization of Flowers.” A number of curious varieties of birds’ eggs were exhibited by Mr. George Jackson, including sparrow hawk, five varieties ; kestrel, blackbird, seven ; tree sparrow, two ; cuckoo, redbreast, three ; yellowhammer, two ; linnet, two ; tree pipit, five ; meadow pipit, four ; and chaffinch, two.—T. H. RUSHFORTH, Hon. Sec.

MIRFIELD NATURALISTS' SOCIETY.—Meeting 5th May.—Mr. William Hardman read a paper on the Foxglove (*Digitalis purpurea*) ; 47 plants were laid on the table, 27 of them being in bloom, amongst them were the following :—*Ranunculus repens*, *R. auricomus*, *Myrrhis odorata*, *Pedicularis sylvatica*, *Cardamine pratensis*.—ED. STOKS, Hon. Sec.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting, April 28th, Mr. T. Scott, president, in the chair.—A number of specimens in geology were exhibited by Messrs. Midgley and Cockroft, amongst them being some very good *Belemnites* from the new railway cutting. The following birds were first heard in the district by Mr. R. Earnshaw :—April 7th, the ring-ouzel ; 9th, the willow warbler and redstart. Mr. T. Hirst exhibited a few birds, including a beautiful case of snowy owls from America.—J. OGDEN. Hon. Sec.

STAINLAND NATURALISTS' SOCIETY.—Monthly meeting, April, at Burrwood, Mr. C. C. Hanson in the chair.—Specimens in botany and entomology were exhibited and named. In ornithology, the arrival of spring migrants were given as follows :—Wheatear, March 21st ; sand martin, April 7th ; Ray’s wagtail, 8th ; willow wren, 8th ; stonechat, 15th ; redstart, 23rd ; tree-pipit, 24th ; cuckoo, first heard May 5th ; whinchat, 6th ; house martin, 6th ; corncrake, 6th ; sedge warbler, 13th ; greater whitethroat, 13th. Large flocks of fieldfares were seen on the 8th inst. returning to Northern Europe, where they breed, having been detained in consequence of the cold weather.—C. C. HANSON, Sec.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly meeting, May 4th, the president, Mr. J. Wainwright, F.L.S., in the chair, who gave an address entitled “Notes of a journey from Alexandria to Smyrna,” and exhibited a number of beautiful photo graphs, also ornaments which are worn by the natives. Mr. Hall exhibited a robin’s nest built in an old lantern which had been thrown away. Mr. Sims, *E. albula*, *A. bisetata*, *E. minutata*, *N. fulva*, *P. syringaria*, *C. duplaris*, *V. cambricaria*, *L. complanula*, *T. chærophyllata*, and *A. mendica* (bred).—JOHN SPURLING, Hon. Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting, Mr. Mark Smith in the chair.—The proceedings were chiefly of archæological interest, a paper on the subject being read by Mr. Chapman. The

secretary exhibited a very fine specimen of the diamond beetle, from Thebes, taken by Mr. J. Wainwright, of Wakefield, during his tour in Egypt and Syria last autumn ; also fine specimens of *Fidonia conspicuata*. —W. PREST, Hon. Sec.

YORKSHIRE NATURALISTS' UNION.—The second meeting of the year was held at Wetherby on the 21st of May. The district being a very productive one in various branches of natural history, there was, in spite of the unpromising weather, the enforced absence of many members connected with Sunday schools, and the inaccessibility of the locality from several towns, a very good attendance, nearly a hundred members being present during the day. Among the chief attractions of the district were the numerous fine and large trees, including the famous Cowthorpe Oak, the Tockwith Broad Oak, a very remarkable and fine cherry tree at Kirk Deighton, and a large amount of fine timber in the valleys both of the Wharfe and Nidd. A party of members who visited the grounds of Ribston Park by permission of John Dent Dent, Esq., were courteously conducted over the grounds by Mr. Jones, the head gardener. He showed them the original stump of the famous Ribston pippin, preserved in his house, also the young shoot which has sprung from the old root ; also a very ancient mulberry tree in the yard of the chapel attached to the house, and said to have been planted by the Knights Templars ; in a garden a very fine collection of pines, of which some of the *Wellingtonias* were very good ; and a specimen of the *Pyrus domestica*, not elsewhere known to exist in a wild state in England except in the forest of Wyre, in Staffordshire. A large number of members explored the country about Collingham, and one of the parties followed a very interesting route down the left or north bank of the Wharfe between Wetherby and Flint Mill. All the parties re-assembled at Wetherby at three o'clock, when tea was provided in the lower room of the Town Hall. After tea, the sections met, two in the Town Hall, and the other three at the Angel Hotel. The general meeting was held at 5 p.m., in the upper room of the Town Hall, Mr. Joseph Wainwright, F.L.S., presiding. The Leeds Geological Association was elected into the Union. The roll of societies was called, when it was found that representatives were present from the following societies :—Huddersfield (Naturalists'), Heckmondwike, Barnsley, Wakefield, Ovenden, Liversedge, Bradford, Leeds (Naturalists' Club), Goole, York, Selby, Huddersfield (Literary and Scientific), Huddersfield (Scientific Club), Leeds (Conchological Club), and Leeds (Geological Association). The visitors included Mr. Henry Crossley, of Wetherby, the Rev. J. T. Toogood, M.A., rector of Kirkby Overblow, and Mr. Emmett, of Boston Spa. The reports of the sections were then given. Mr. Henry Crowther, of Leeds, secretary of the conchological section, reported that forty-one species and seven varieties had been taken, including *Cyclostoma elegans* and *Clausilia laminata* in abundance. Mr. Emmett showed some good shells

found in the district, including a reversed specimen of *Cochlicopa tridens* and a *Helix cantiana*, with the spire very much raised. The beetles were *Badister bipustulatus*, *Pterostichus striola*, *P. niger*, *P. madidus*, *P. cupreus*, *Rhagium bifasciatum*, *Helophorus aquaticus*, *Agabus uliginosus*, *Hydroporus 12-pustulatus*, *Acilius sulcatus*, *Amara communis*, *Geotrupes stercorarius*, *Meloë violacea*, *Nebria brevicollis*, *Phytonomus punctatus*. Mr. William Prest, of York, president of the Entomological Section, reported that nothing worthy of note had been taken. He exhibited, along with Mr. Dennis, a remarkable sheet of web, some 10ft. long and 5ft. wide, from a chocolate store in York, made by *T. albipunctella*, and the specimen of *Pieris crataegi*, taken in Bradford, was also shown by its captor ; Mr. Thos. Lister, a specimen *Chærocampa Nerii*, taken at Hemel-Hempstead, in the garden of Capt. Daly, late of Monk Bretton. Dr. H. Franklin Parsons, of Goole, secretary of the Botanical Section, recorded 135 flowering plants and ferns, the most noteworthy being *Helleborus viridis*, *Actaea spicata*, *Cochlearia officinalis*, *Viola hirta*, *Saponaria officinalis*, *Cerastium arvense*, *Rhamnus catharticus*, *Rosa rubiginosa*, *Bryonia dioica*, *Pimpinella magna*, *Campanula latifolia*, *Primula caulescens* (*Oxlip*), *Paris quadrifolia*, *Convallaria majalis*, *Colchicum autumnale*, and *Equisetum maximum*. A good number of mosses, lichens, and fungi were collected, but the time at the disposal of the section was not sufficient to allow them to be examined, and they were referred for microscopic examination to members of the committee. On the Geological Section being called upon for a report, Mr. Wm. Denison Roebuck, of Leeds, secretary of the Union, stated that having heard from Mr. Joseph Tindall that neither he nor Mr. James Spencer of Halifax could be present, the management of the section had devolved upon the general officers ; and that Mr. Edward Brooke, F.G.S., of Huddersfield, had been chosen president, and Mr. H. R. Moiser, F.G.S., of York, secretary of the section. There was no further report, nor any observations made upon the geology of the district. Mr. Thos. Lister, of Barnsley, secretary of the Vertebrate Section, reported, during the day's excursion—Spring migrants : wood wren, chiff-chaff, whitethroat, sedge warbler, redstart, swallow, house martin, sand martin, swift, tree pipit, corn crake ; Resident birds : blackbird with eggs, thrush, missel thrush, lesser redpole with eggs, starling with young, built in the great oak at Cowthorpe, great, blue, and long-tailed tits, chaffinch, wood pigeon, meadow pipit, yellowhammer, grey wagtail, and pied wagtail.—A vote of thanks to the subscribers to the Union, of which the secretary read a list, was then proposed by Mr. Henry Crossley, of Wetherby, who took this opportunity of welcoming the Union to his native town. Votes of thanks to Dr. J. S. Wesley, the local secretary, to whom much of the success of the day was due ; to Mr. John Emmett, of Boston Spa, for exhibiting his collections of shells of the neighbourhood ; to Mr. Jones, gardener at Ribston Park ; and to the chairman, concluded the proceedings.—WM. DENISON ROEBUCK, Sec.

Diary.—Meetings of Societies.

- June 2. Goole Scientific : Excursion to Broughton, &c. Huddersfield Naturalists'. Mirfield Naturalists'.
- ,, 5. Bishop Auckland Naturalists'. Liversedge Naturalists'. Leeds Naturalists' Club, &c.
- ,, 7. Leeds Conchological Club.
- ,, 8. Huddersfield Scientific Club : Paper "On some Species of *Tortula*," by Mr. C. P. Hobkirk.
- ,, 12. Leeds Naturalists' Club, &c. : Paper by Mr. Frederick Greenwood, M.R.C.S.V.
- ,, 13. York and District Naturalists' Field Club.
- ,, 14. Leeds Conchological Club.
- ,, 16. Yorkshire Naturalists' Union : Excursion to Nostell Priory ; Meeting at Royal Hotel, Wood-street, Wakefield, at 4 p.m. Local Secretary—Mr. Wm. Talbot.
- ,, 18. Huddersfield Naturalists'.
- ,, 21. Leeds Conchological Club. North Staffordshire Naturalists' Field Club : Excursion to Waterhouses and Hamps Valley. Leader—Mr. W. S. Brough.
- ,, 26. Leeds Naturalists' Club, &c.
- ,, 28. Leeds Conchological Club.
- ,, 30. Huddersfield Naturalists'.

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TO CORRESPONDENTS.

Owing to a great press of matter in hand, we have been obliged (reluctantly) to hold over several notices received, more particularly those on *Colias Edusa* in Yorkshire; the whole of the latter will be reported on by Mr. Porritt in our next issue.

Several Reports of Societies did not arrive until too late.

All communications, except Advertisements, Exchanges, or Short Queries, should, if possible, be in the hands of the Editors not later than the 18th of the current month, to insure insertion in our next issue, and should be written on one side of the sheet only.

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Original Articles.

A LIST OF THE ZOOPHYTES OF THE VALLEY OF THE CLYDE.

By DR. R. H. PATERSON,
Professor of Botany, Anderson's College, Glasgow.

THE following list is only intended as a small contribution towards a complete catalogue of the marine zoophytes found in the Firth of Clyde. The importance of these local lists whether of plants or animals is now becoming more widely recognized; the difficulty however of making these in some degree complete can only be appreciated by those who are engaged in such enquiries. No one can expect to find in every coast town an observer who devotes special attention to these very minute and often obscure groups of marine animals. During the last three years I have spent much of my time in the study of marine zoology and botany, and having noted almost every species that I came across, I have formed a pretty extensive catalogue of the various forms of animal life to be found in the Clyde. For many of these species I am indebted to Messrs. J. Harvie, vice-president of the Glasgow Society of Field Naturalists, and W. Smith, Largs. The ground gone over is as follows:— Rothesay Bay, to the head of Loch Striven, Largs, Innellan, Saltcoats and Ardrossan, including parts of the Islands of Arran and Cumbrae.

CLASS I. ANTHOZOA.

I.—ANTHOZOA HYDROIDA.

Clava multicornis, Pall. A parasite on sea-weeds, Arran.

Hydractinia echinata, Mont. On shells of *Buccinum* inhabited by hermit crabs, Cumbrae and Ardrossan.

Coryne pusilla, Gaert. On sea-weeds near Largs.

Eudendrium rameum, Ehr. On shells of the common whelk, Innellan.

E. ramosum, Ellis. Near Saltcoats, on stones.

Tubularia indivisa, Lloyd. On stones in Loch Striven, Innellan, Largs, Rothesay, Cumbrae.

T. larynx, Ellis. On the Largs Buoy.

Halecium halecinum, Newt. On shells near Ardrossan, Arran.

H. Beanii, Bean. This species has been dredged in Arran, Saltcoats, and Largs.

- Halecium muricatum*, Shene. On shells in Loch Ryan and Ardrossan.
- Sertularia polyzonias*, Newt. On sea-weeds and shells from Largs to Troon.
- S. ellisii*, Edwards. On algæ, especially species of *Halydris* in Lamlash Bay.
- S. nigra*, Pallas. In Loch Striven attached to the loose stones. Turns black when dried.
- S. rugosa*, Ellis. On algæ and sponges, Ardrossan, and on *Flustra*, Innellan.
- S. rosacea*, Ellis. On shells and algæ near Largs, Innellan.
- S. pumila*, Doody. On algæ, Innellan, Arran, in Brodick Bay.
- S. pinaster*, Thomp. Dredged at Troon.
- S. fallax*, Flem. On the Ayrshire coast opposite the small Cumbrae.
- S. margarita*, Tudor. On shells in Lamlash Bay, Largs, and Cumbrae.
- S. tamarisca*, Ellis. On shells and algæ at Saltcoats, and near Largs.
- S. filicula*, Huds. On the roots of *Laminaria digitata*, Toward Point.
- S. abietina*, Flem. On stones and shells Largs, Arran and Innellan.
- S. operculata*, Ellis. On algæ at Troon, Innellan and Loch Fyne.
- S. argentea*. On shells on various parts of the Ayrshire coast, apparently rare.
- S. cupressina*, Ellis. On shells near the Loch of Arran, very large in Millport.
- Thuiaria thuia*, Sibbald. On shells of *Pecten* on the Ayrshire coast, and in Loch Striven.
- T. articulata*, Ellis. On stones and shells on the Arran shore.
- Antennularia antennina*, Ward. On stones at Largs and Rothesay Bay.
- A. ramosa*, Dare. On shells and stones on the shores of the Cumbrae, Innellan.
- Plumularia cristata*, Ellis. On algæ, on the Innellan and Ayrshire coasts, and Loch Striven.
- P. pinnatula*, Mont. Rare on the Ayrshire coast, Largs, and Wemyss Bay.
- P. pinnata*. On stones and shells, Arran, Ardrossan, Innellan, and Skelmorlie.
- P. setacea*, Ellis. On shells and algæ in Loch Striven and Loch Fyne.
- P. catharina*, John. On shells and algæ, Arran, Cumbrae, and Loch Fyne.
- P. myriophyllum*, Ellis. On stones in Lamlash Bay, Largs and Rothesay.

P. falcata, Ellis. Near Ardrossan. The specimens were covered with *Halichondria parasitica*.

P. frutescens, Ellis. Attached to stones or shells in Lamlash Bay. Very rare.

Laomedea dichotoma, Ellis. On shells on the Ayrshire coast.

L. geniculata, Doody. On Melobesia, opposite Innellan Perch.

L. gelatinosa, Dill. On stones and algæ at Largs, Innellan, and Troon.

Campanularia volubilis, Ellis. On shells and algæ on the Ayrshire coast.

C. syringa, Ellis. On algæ and stones on the Ayrshire shore, as at Troon.

C. lacerata, John. A parasite on other zoophytes at Innellan.

C. verticillata, Ellis. On algæ and shells, Largs, Millport, Innellan, and Arran.

C. dumosa, Pallas. On stones and other zoophytes, Innellan and Toward.

Hydra viridis. In ponds and ditches, Possil Marsh, and pools in Cumbrae.

H. vulgaris. Attached to aquatic plants in Loch Fadd, and Innellan.

II.—ANTHOZOA ASTEROIDA.

Pennatula phosphorea, Sibbald. Attached to the sand or swimming free in the water in Loch Fyne, Ardrossan, Lamlash Bay, and Largs.

Virgularia mirabilis, Simmons. Largs and Loch Fyne.

Paronaria quadrangularis. This species is only to be found off the island of Kerrera, on our western shores.

Gorgia flabellum-veneris. This is not a native species, although it was found in Lamlash Bay.

Alcyonium digitatum. Attached to rocks, shells, and stones everywhere in the Firth of Clyde. Large specimens are to be obtained round Skelmorlie Buoy.

A. glomeratum. On shells and loose stones round Skelmorlie Buoy, Largs, Cumbrae, and Ardrossan.

Sarcodictyon catenata. On the loose stones in Kilfinan Bay, Loch Fyne, Largs, Cumbrae, &c.

III.—ANTHOZOA HELIANTHOIDA.

Pocillipora interstincta. Zetland.

Oculina prolifera. On large stones between the islands of Rum and Egg—Landsburgh's zoophytes.

Turbinolia borealis, Zetland.

Caryophyllea Smithii, Fleming. On stones off the islands of Cumbrae and Arran.

Corynactis viridis, G. J. Allman. Common in the pools left by the tide, Largs, Cumbrae, and Ardrossan.

Adamsia palliata, Adams. Attached to the shells inhabited by hermit crabs, Innellan, Skelmorlie, Largs, Cumbrae, and Ardrossan.

Actinia mesembryanthemum, Ellis. Attached to rocks everywhere in the Firth of Clyde.

Anthea tuediae, John. In deep water off Largs, Cumbrae, and Arran.

Actinoloba dianthus, Ellis. Attached to the rocks, Kilfinan Bay, Bute, Arran, and Cumbrae.

Sagartia bellis, Ellis. Attached to the rocks in Arran and Cumbrae.

S. miniata, Gosse. In the rock pools in Kilfinan Bay, Loch Fyne, and in the islands of Cumbrae and Arran.

S. venusta, Gosse. In rock pools on the islands of Cumbrae and Arran, and in Loch Fyne.

S. parasitica, Couch. Apparently very rare—only found as yet in the Cumbrae.

S. viduata, Muller. On the rocks near Ballimore, and in Cumbrae, Bute, and Arran.

S. nivea, Gosse. On rocks in the island of Cumbrae.

S. troglodytes, Johnston. On the rocks in Loch Striven, Innellan, and Cumbrae.

Phellia picta, Gosse. On shells, as at Skelmorlie Buoy and Cumbrae.

Bolocera eques, Gosse. On algæ, Cumbrae.

Tealia crassicornis, Muller. On rocks and algæ beyond low water; Innellan, Toward, Loch Striven, Cumbrae, Bute, and Arran.

Stomphia Churchiae, Gosse. On stones in Loch Striven, Cumbrae, and Arran.

Bunodes thallia, Gosse. In tide pools and on rocks in Cumbrae.

Anthea cereus, Ellis. Always attached to *Zostera marina*, Toward, Largs, Cumbrae, Bute, and Arran.

Cerianthus Lloydii, Gosse. On mud, Innellan, opposite the Perch, and in Cumbrae, Loch Fyne, opposite the Otter House, Kilfinan.

Peachia hastata, Gosse. Among algæ opposite Innellan, Tan Buoy, Cumbrae, and Arran.

P. triphylla, Gosse. In the muddy sand at low water, Cumbrae.

Edwardsia callimorpha, Gosse. In sand off Largs, Ardrossan, Cumbrae, and Arran.

E. carnea, Gosse. Apparently very rare; only found as yet in Cumbrae.

Anthea cereus, Gaert. On the Argyleshire coast.

A. tuediae, John. In deep water, Innellan, Gourock, Cumbrae, Loch Fyne, and Arran.

Iluanthus scoticus, Forbes. On mud, Loch Fyne, Ardrossan, and Cumbrae.

Locernaria fascicularis, Fleming. Attached to algæ, Innellan, Arran, Largs, Ardrossan, Saltcoats, Rothesay, and Loch Fyne.

L. cyathiformis. Very rare in Britain; found in Arran in several places.

CLASS II. POLYZOA.

1.—POLYROA INFUNDIBULATA.

Tubulipora hispida, Cord. On seaweeds and other zoophytes, Arran and Ayrshire coast.

T. flabellaris, Thomp. An algæ, Ayrshire coast.

T. serpens, Ellis. Algæ, Ardrossan, and Largs.

Alecto dilatans, Thomp. In very deep water off the Mull of Galloway; Professor Forbes.

Crisia eburnea, Ellis. Common on algæ and Flustra at Ardrossan.

C. denticulata, Fleming. On seaweeds and zoophytes, Saltcoats, Portincross, Innellan, and Largs.

C. gracilis. On Flustra near Stevenston.

C. aculeata, Hass. On algæ and zoophytes, Largs, Troon, Lamlash, and Ballantrae.

C. geniculata, Lister. On algæ in various places on the Ayrshire coast.

Crisidium cornuta. On seaweeds and corallines, Ardrossan, Arran, Loch Fyne, and Innellan.

Eucratea chelata, Ellis. Ardrossan and Stevenston, attached to seaweeds: rare.

Anguinaria spathulata, Ellis. On seaweeds on the Ayrshire coast.

A. truncata, Lands. On *Laminaria* in Lamlash Bay, Arran.

Hippothoa catenularia, Jameson. On molluscs in deep water, Innellan.

H. divaricata, Elliott. On molluscs and algæ, on the Ayrshire coast and Loch Fyne.

- Notaria loriculata*. On algæ in Loch Fyne, Ballimore, and Kilfinan.
- Cellepora pumicosa*, Ellis. On stones, algæ, zoophytes, and shells in Loch Fyne.
- C. cervicornis*, Borl. In deep water off Cumbrae, Innellan, Lamlash, and Ardrossan.
- C. lœvis*, Fleming. A parasite on other zoophytes, found off the Cock of Arran.
- Lepralia hyalina*. On algæ, Innellan.
- L. tenuis*, Hass. On algæ, Innellan.
- L. Hassallii*. On shells, rare, Arran and Largs.
- L. simplex*, Hynd. On shells, Innellan.
- L. ventricosa*, Hass. On shells, Saltcoats.
- L. Hyndmanni*. On shells, Cantyre coast.
- L. ansata*. On rocks, Argyleshire coast.
- L. linearis*, Hass. On shells, Lamlash Bay.
- L. granifera*, Johnston. Rocks at Saltcoats.
- L. Landsborovii*, Johnston. On shells, Ayrshire coast.
- L. pertusa*, Thompson. On shells, Cantyre coast.
- L. punctata*, Bean. On rocks, Arran and Ayr.
- L. annulata*. On shells, Arran, Cumbrae, and Cantyre.
- L. biforis*, Thomp. On shells, Ardrossan.
- L. Peachii*. Shells on Cantyre and Ayrshire coasts.
- L. pediostoma*, Hass. Lamlash, Largs, and Ardrossan.
- L. reticulata*. On shells in Loch Fyne.
- L. variolosa*. Stones, Ardrossan and Arran.
- L. nitida*, Fleming. Shells on Ayrshire coast.
- L. innominata*, Peach. On shells, Cantyre coast.
- L. unicornis*. On Laminaria, Ardrossan.
- L. Ballii*. On shells on Cantyre coast.
- L. coccinea*, Fleming. On stones, Saltcoats.
- L. ciliata*. On algæ, Largs and Arran.
- L. immersa*, Johnston. Shells in Loch Fyne.
- Membranipora pilosa*, Ellis. On algæ and shells, Cumbrae, Innellan, and Ardrossan.
- M. membranacea*, Fleming. On shells, Ardrossan, Millport, Portincross, and Loch Striven.
- Cellularia ciliata*, Ellis. On algæ, Stevenston, and Saltcoats.
- C. scruposa*, Ellis. On algæ on the Cantyre coast and Lamlash Bay.
- C. reptans*, Ellis. On corallines and seaweeds, Largs, Cumbrae, and Arran.

- C. avicularia*, Ellis. On corallines in very deep water, Innellan, Loch Fyne, and Bute.
- C. plumosa*, Doody. On shells and algæ in Loch Fyne, Stevenston, and Arran.
- Flustra foliacea*. On stones, algæ and shells, Loch Ryan, Ardrossan, Arran, Largs, Innellan, Toward, and Loch Fyne.
- F. chartacea*. Very rare, Girvan.
- F. truncata*. On shells, stones, and algæ, Ardrossan, Portincross, Kilfinan, and Otter.
- F. carbarea*, Shene. On algæ and stones, Cartyre coast : rare.
- F. avicularis*, Ellis. On other species of Flustra, Loch Fyne, L. Ryan, and Ardrossan.
- F. Murrayana*, Bean. On other species of Flustra, Kilfinan, apparently very rare.
- F. membranacea*, Ellis, on *Laminaria digitata* and on stones, Innellan, Toward, very common.
- F. coriacea*, Forbes. On old shells, Cartyre coast.
- F. lineata*, Jameson. On stones and algæ in Loch Fyne, Toward, Loch Striven, and Bute.
- F. hispida*. On *Fucus serratus*, Innellan, Bute, Ayrshire and Cartyre coasts.
- Salicornaria farciminoidea*. Arran.
- Alcyonium parasiticum*. On zoophytes in Loch Fyne, Kilfinan, and Ballimore.
- A. hirsutum*. On algæ and zoophytes on the Ayrshire coast.
- Serialaria lendigera*. On algæ in Loch Fyne.
- Vesicularia spinosa*. On shells, Kilfinan and Otter.
- Valkeria cuscuta*. Ardrossan and Stevenston.
- V. pustulosa*, Ellis. Kilfinan, rare.
- Bowerbankia imbricata*, Adams. On algæ, coast of Ayr.
- Pedicellina gracilis*. On wood, Ballimore.

II.—POLYZOA HYPOCREPIA.

- Cristatella mucedo*. Fresh water, Ben Breckt.
- Alcyonella stagnorum*. Kenmuir Bank.
- Fredericella sultana*. Loch Lomond.
- Plumatella reptans*. On the underside of stones, Forth and Clyde Canal, Possil Marsh, Ben Lomond, and in a quarry on the leaves of the water-lily, Paisley Canal.

OLD RIVER GRAVELS IN THE VALLEY OF THE COLNE.

BY EDWARD BROOKE, F.G.S.

Two patches of old river gravel occur in the valley of the Calder, and are figured on the geological map of the district, sheet 246 (6-inch scale). That at Elland rests on a bed of shale immediately above the Rough Rock; at its southern boundary it attains an elevation of 350 feet above the sea level, and extending northwards reaches a height of 380 feet. Below the Weir the height of the river is 200 feet, so that the difference in the height of the present river bed and the old river gravel is 180 feet.

The other deposit of old river gravel occurs at Kirklees Park, at a place known as Robin Hood's grave. This bed rests on the Clifton rock, of the lower coal measures, and is 300 feet above sea level, and 150 feet above the present river bed.

Both these interesting deposits are formed principally of local sandstones and ganister, but contain also well-rounded boulders of foreign rocks, granite, black limestones, and hard silurian shales.

When Messrs. Ward, Daykins, and Russell, of H.M. Geological Survey, surveyed the district, no exposure of old river gravel was then known in the valley of the Colne, but recent excavations have revealed two interesting sections. The first is at Hillhouse, immediately contiguous to the White Stone Engine Sheds of the L. and N.W. Railway Company. A section of this gravel can be seen on the south side of the railway, commencing below the signal-box and extending to the bridge going east; it was sunk through in a pit 250 yards north-west of the Sheds, and there gave the following section :—

	ft.	in.
Earth	2	0
Fine sand	2	0
Coarse gravel	3	0

On the railway section the fine sand appears to have thinned out, leaving only the coarse gravel. This gravel rests on a bed of shale immediately above the hard bed coal of the lower coal measures, and is 275 feet above sea level, or 85 feet above the level of the present river. Its probable area will be about twenty acres.

The other section of gravel has been exposed by a recent extension

of the Deighton Station, about one mile further east on the same line of railway. The section immediately behind the station gives—

	ft.	in.
Earth 	2	0
Coarse gravel 	3	6
Black shale 	7	0

This bed is 225 feet above sea level, or 50 feet above the present river bed.

Although the two patches of gravel in the valley of the Calder and the Colne are probably of the same age, yet their composition is entirely different: for, whilst the former contain foreign rocks in considerable abundance, the latter are made up of local sandstones and ganisters, with a complete absence of older rocks.

The absence of glacial deposits in the valley of the Colne—and indeed within its watershed—has been noted by H.M. Geological Surveyors, and seems to point to the conclusion that during the glacial period a barrier of high ground, trending north and south, extended from Todmorden into Derbyshire, of sufficient altitude to prevent the extension of the glacial sea into the large area drained by the river Colne.

Huddersfield, May 10th, 1877.

Short Notes and Queries.

Upupa epops AT TOCKWITH.—A fine male specimen of the Hoopoe (*Upupa epops*) has been shot at Tockwith, near York, and has been sent for preservation to Mr. Ripley, of Feasgate, York.—J. S. WESLEY, Wetherby.

SPARROWS DESTROYED BY HAIL.—I have more than once heard (and I dare say other readers could say the same, though it may not have come directly under their notice) of sparrows being killed in numbers by unusually heavy showers of hail and sleet, and of courtyards which in the morning have been found strewn with the little feathered corpses, under the trees where they had been seen roosting the night before. I find from an old note that something of the kind happened in this parish (Northrepps in E. Norwich) in September, 1833, when nearly 300 dead sparrows were picked up after a storm under a single tree. This must have been a heavy gale to cause such slaughter. Sparrows are as plentiful in Norfolk as in any county, and we could well afford to spare a

few, their unsightly nests and clamorous evening meetings bringing them into disfavour, while their incessant pilfering counterbalances in the eyes of a great many people their depredations on destructive caterpillars.—
J. H. GURNEY, Jun., Northrepps Cottage, Norwich.

Rainfall for May.

HUDDERSFIELD (Dalton, 350 feet).—During May 3·65 inches of rain were registered, making the total so far for 1877, 17·14 inches. The heaviest fall was on the 9th, 0·81 inches. 0·01 inches or more of rain fell on 15 days. The average fall during May in the eleven years ending 1876 has been 1·83 inches in 12 days; and the average of the first five months, 11·95 inches.—J. W. ROBSON.

WAKEFIELD.—The rain which fell in this month was 2·47 inches; greatest fall on the 16th, ·55 inches; wet days, 15. Temperature: highest (in shade) $63\frac{1}{2}^{\circ}$ on 31st; lowest 25° , on 6th.—FREDK. HILL.

LEEDS.—(137ft. above sea, gauge 46ft. above ground). Total rainfall, 1·965 in. Heaviest day's fall on the 17th, ·550. Rain fell on 14 days. Thunder storm on the 17th. The mean or adopted reading for the month of the barometer being 29·720 inches, the highest being on the 1st, 30·301, and the lowest on the 28th, 28·876.—H. CROWTHER.

BARNESLEY (350 feet).—3·44 on 15 days; most (1·06 inches) on the 9th.—Stainbro Park (600 feet): 3·24 on 14 days; most (·96 inches) on the 9th.—Ingbirchworth Waterworks (853 feet): 4·53 on 12 days; most (·87 inches) on the 9th.—T. LISTER.

GOOLE.—Total fall, 1·37 inches: wet days, 14; greatest fall, ·29 inch on 17th. Temperature: maximum 66° F. on 27th, minimum 27° on 4th and 6th. Mean of month $47\cdot3^{\circ}$, mean daily range $15\cdot1^{\circ}$.—H. FRANKLIN PARSONS.

Reports of Societies.

BARNESLEY NATURALISTS' SOCIETY.—Meeting June 4th, the president, Mr. T. Lister, in the chair.—Some additional dates of spring migrants were given—the full list was completed last month. As this has been a remarkable season, a few coming early, but the main body late, we briefly record them. The chiff-chaff first reported at Criggleston, March 28th, again heard April 1st; the wheatear seen March 31st, it had been seen on Greetland Moor as early as March 24th; the cuckoo heard by Mr. J. Ward beyond Bretton, on the 3rd April; sand martin, March 31st;

willow wren, April 2nd ; ring ouzels same day, seen on the moors by Mr. W. J. Cope ; yellow or Ray's wagtail, 4th ; whinchat and whitethroat, 6th ; swallow, 8th ; house martin, 10th ; tree pipit, 11th ; redstart, 13th ; sedge warbler, 14th ; lesser whitethroat, 18th ; grey or spotted fly-catcher, 24th ; grasshopper warbler, 24th ; same day is recorded for the nightingale near Doncaster, by Mr. J. Parker, Shambles Street ; he and his son have heard it since that date : it has been recorded a few miles nearer Barnsley in early May ; garden warbler, May 3rd ; swift, the last of the swallow tribe, 7th ; goat sucker or night-jar heard above Gordale Scar during the Mechanics' excursion, May 25th : no doubt it has occurred in our district earlier, but not recorded ; wood wren or wood warbler, 14th ; sand pipers occurred early in May. The only migrant not yet observed is the pied fly-catcher—local in distribution, as in Stainbro' Park, Cannon Hall, and Wharncliff.—A very large beetle was exhibited by Mr. T. Lister, brought for him from China by Mr. W. Henshall, of the 10th regiment (now on furlough). It is $2\frac{1}{2}$ inches long, and $1\frac{1}{2}$ broad.

BRADFORD NATURALISTS' SOCIETY.—Meeting May 29th, the president in the chair.—Mr. Wm. Jagger gave an interesting account of a week's ramble in Huntingdonshire, the larvæ of *Apatura Iris*, *Scotosi arhamnata*, *Acronycta strigosa*, *Pterophorus trigonodactylus*, *P. fuscodactylus*, *P. galactodactylus* being among the specimens collected. The following botanical specimens were collected and exhibited by Mr. Soppitt :—*Geum rivale*, *Lamium Galeobdolon*, *Lysimachia nemorum*, and *Fedia otitoria*.

BURY NATURAL HISTORY SOCIETY.—Monthly meeting in the Athenæum, the president, Mr. R. H. Alcock, in the chair.—The following plants were exhibited :—*Barberis vulgaris*, *B. intermedia*, *Trollius Europaeus*, *Scilla nutans*, &c. Mr. Kaye exhibited larvæ and imagos of *Scodiona belgiaria*, *Aspilates strigillaria*, *Bombyx callunæ*, and specimens of *Paludina contecta*, from Southport. Mr. Alcock exhibited *Helix aspersa* and *Clausilia nigricans*, from Whalley. Mr. Hall exhibited *Bombyx mori* (the common silk-worm).

GOOLE SCIENTIFIC SOCIETY.—An excursion was made on June 2nd, to Appleby, Broughton, and Frodingham ; the attendance was not numerous, owing no doubt to the unsettled weather. On arriving at Appleby, the geologists went to the vicarage to view the Rev. J. E. Cross' magnificent collection of fossils from the oolites and lias of North Lincolnshire. The rest of the party explored Bird's Pond and Broughton Woods. Broughton Woods are very extensive, covering upwards of 2000 acres ; they abound in wild flowers, being especially noted for lilies of the valley, which grow in abundance over many acres, and blossom freely, which is not often the case with the lily of the valley in its wild state. From the woods a footpath led to Frodingham, whence, after visiting the blast furnaces and ironstone pits, the party returned by train to Goole. The day's botanical observations included 115 flowering

plants, among them *Aquilegia vulgaris*, *Teesdalia nudicaulis*, *Prunus Padus*, *Spiraea filipendula*, *Circaea lutetiana*, *Chærophyllyum Anthriscus*, *Valeriana dioica*, *Lamium Galeobdolon*, *Myosotis collina*, *Paris quadrifolia*, and *Convallaria majalis*: Twenty-five mosses and liverworts, among them *Grimmia apocarpa* fr., *Orthotrichum saxatile* fr., and *Hypnum Schreberi*, *filicinum*, *triquetrum*, *albicans*, and twelve lichens, *Parmelia caperata* being one, and five fungi, among them *Agaricus clypeatus*, and *Polyporus abietinus*. The only mollusca observed were *Clausilia laminata* and *Helix lapicida* and *rotundata*. In an old quarry of cornbrash close to Appleby Station, about six species of fossils were obtained ; eight or nine kinds were got from stones (inferior oolite) on the roadside, and about as many kinds in the lower lyas at the ironstone pits at Frodingham. Individuals are, however, far more abundant here than in the oolites.—[Corrections in report of last meeting : *Terebratula spinosa* species not determined, *Lima gigantea* (small form) should be *L. bellula*, *Pinna mitis* should be *P. cuneata*, *Clausilia biplicata* should be *C. nigricans*.]—H. FRANKLIN PARSONS, Sec.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting June 2nd, the president in the chair.—The following local plants were exhibited by Mr. J. Mellor :—*Oenanthe Lachenalii*, *Veronica serpyllifolia*, *Convallaria majalis*, *Armoracia rusticana*, *Myrrhis odorata*. By Mr. Mackenzie, the following from Derbyshire :—*Hutchinsia petraea* (fl.), *Bryonia dioica*, *Saxifraga tridactylites* (fl.), *Veronica hederifolia* (fl.), *Draba verna* (fl.), *D. muralis* (fl.). In conchology were shown *Clausilia laminata*, *H. nemoralis*, *H. cantiana*, *H. rufescens*. In geology Mr. Tindall exhibited the local specimens : *Sigillaria reniformis*, &c. An excellent paper was read by Mr. Geo. Jarman, F.C.S., entitled “Iron pyrites, and the products obtained therefrom.”—J. MACKENZIE, Hon. Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting June 8th, in the Museum, South-street, Mr. C. P. Hobkirk, president, in the chair.—The exhibitions were numerous, and included the red-winged starling found at Adwick-le-Street in March (see *Naturalist*, ii., 153), by Mr. S. L. Mosley ; it was a very perfect and beautiful specimen, and only the tenth recorded occurrence of the species in Britain. In lepidoptera, Mr. G. T. Porritt showed a specimen of *Trachea piniperda* he had found several weeks previously, on some palings facing the sea on the south shore at Southport. The locality seemed an extraordinary one, as he could detect no fir or pine about the place. Mr. Porritt also stated he had just added to his collection the specimen of *Chærocampa Nerii*, taken at Hemel Hempstead in October last. It was a fine large female moth, but had lost a small piece from the left lower wing. Mr. James Varley shewed a case of exotic species, including *Papilio asteris*, *Danais Archippus*, with a fine yellow variety of the same, *Vanessa Antiopa*, a *Bombyx* allied to *Neustria*, a *Colias*, two species of *Catacola* allied to *Nupta*, with magenta and red underwings, &c., &c. Mr. S. L. Mosley recorded the

occurrence of *Colias Edusa* near his residence at Primrose Hill, on the 5th inst. In conchology, Mr. John Conacher shewed *Helix pygmea*, *H. pulchella*, *H. virgata*, *H. rotundata*, *H. hispida*, *H. nemoralis*, *Zonites nitidulus*, *Z. alliarius*, *Clausilia rugosa*, *Cochlicopa lubrica*, *Pupa umbilicata*, *Bulimus obscurus*, *Sphaerium corneum*, *Bithynia tentaculata*, *Limnaea truncatula*, var., *elegans*, all from Pontefract : *H. nemoralis*, var., *hortensis*, *H. cantiana*, *H. rufescens*, *H. hispida*, *H. rotundata*, *H. ericetorum*, *H. lapicida*, *Zonites glaber*, *Clausilia rugosa*, var., *tumidula*, *C. laminata*, *Cochlicopa lubrica*, *Cyclotoma elegans*, *Physa hypnorum*, *Limnaea peregra*, all from Wetherby. Mr. H. G. Brierley, a box of various marine shells from Redcar ; also a species of fossil *Anadonta* from the same locality. In Botany, Mr. James Varley, *Saxifraga Andrewsii*, *Convallaria majalis*, *Lastrea spinulosa*, *Mnium undulatum*. Mr. Mosley exhibited, under the microscope some nicely mounted slides of *Acari* from meal, and from a butterfly's wing. The President read a paper on "Some forms of *Tortula*" which he illustrated with beautiful microscopic sections of *Tortula unguiculata*, *T. fallax*, *T. rigidula*, *T. recurvifolia*, *T. spadicea*, *T. cylindrica (insulana)*, and *T. vinealis*.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—248th meeting, May 22nd, Mr. S. Jefferson, F.C.S., V.P., in the chair.—Mr. W. H. Taylor presented to the local collection a locust (*Pachytylus cinerascens*), taken several years ago in Leeds, and *Trichiosoma lucorum*, common in the Meanwood Valley, north of Leeds ; and two specimens of *Cimbex*, from Bramham Park. Mr. W. H. Hay, several nests. The chairman showed under the microscope two samples of water taken from near Leeds and Church Fenton : the latter was remarkably full of an interesting desmid, *Closterium lunula*, in the tips of which the Brownian movement of the granules were very clearly seen. Mr. S. S. Peat showed *Hydra viridis*, found in a ditch near Newark. With the microscope, Mr. F. Emsley showed stained sections of beech and spurge laurel, and a bee parasite ; and Mr. Edward Thompson, *Pleurosigma formosum* and *P. angulatum*. From Wetherby district Mr. W. Denison Roebuck brought *Sialis cutaria* and *Paphidia ophiopsis*, two common neuroptera ; Mr. J. R. Murdoch, *Clausilia laminata*, found in a wood near Flint Mill ; Mr. S. S. Peat, entomostacea ; Mr. Edward E. Prince, dragon-fly larvæ, *Planorbis vortex* and *Daphnia pulex* ; and Mr. Henry Crowther showed specimens of coleoptera (see list, p. 176). There was also exhibited on behalf of Mr. F. G. S. Rawson, of Halifax, some bulbs of frogbit (*Hydrocharis morsus-ranae*) of which about 150 had been taken from the crop of a wild duck, and an article on the subject in the "Country" of March 1st, 1877; was read. A number of notes on the birds of the Halifax district was read, also from Mr. Rawson, assisted by the Stainland Naturalists' Society ; the following dates of arrival of migrants were given :—Wheat-eat, March 21st ; sand martin and ring ouzel, April 7th ; Ray's wagtail and willow wren, 8th ; stonechat, 15th ; redstart, 23rd ; tree pipit, 24th ;

cuckoo, 28th ; swallow, 30th ; whinchat, corn crake and house martin, May 6th. He remarked that the cuckoo and swallow were both late, the latter by fully a fortnight. The cuckoo certainly seems more plentiful about Halifax than in former years. This season Mr. Rawson has again noticed golden plovers on the moorlands.

249TH MEETING, May 29th, Mr. James Abbott, president, in the chair.—Mr. Thomas Hick, B.A., B.Sc., delivered a very able and logical paper on “Evolution and the Vegetable Kingdom,” in which, after pointing out the distinction to be drawn between the general hypothesis of evolution and the special one propounded by Mr. Darwin, he stated that he accepted both theories as consistent with the phenomena which have to be explained, and then discussed the evidence which plants supplied in favour of the Darwinian hypothesis.

250TH MEETING, June 5th, Mr. John Grassham, V.P., in the chair.—Mr. Thomas Benn exhibited a local specimen of *Colias Edusa* (see p. 192). The chairman showed male, female, cocoon, and eggs of *Antheraea pernyii* ; also four specimens of *Smerinthus populi*, being bred from one batch of ten eggs, yet were everyone different in shade and intensity of markings ; also nest and egg of the goldcrest (*Regulus cristatus*), taken in May at Chapeltown, within the borough of Leeds. Messrs. W. H. Hay and Wm. Denison Roebuck exhibited a number of beetles, including a fine pair, male and female, of *Dyticus marginalis*, *Acilius sulcatus*, *Agabus uliginosus*, and *Gyrinus natator*, all taken in a pond at Osmondthorpe, Leeds, June 4th ; also a large number of newts of both the common species (*Triton cristatus* and *Lophinus punctatus*) from the same place. Mr. Charles Rider exhibited dissections of the common smooth newt, and there was a discussion, in which he, Mr. E. E. Prince, and Mr. W. H. Taylor joined, as to the development of the pulmonary apparatus in these animals, especially with reference to the structure and development of the pulmonary sacs. Mr. H. Crowther exhibited spirit-specimens of the larva of *Ephemera*. Mr. John W. Taylor showed several species of genus *Helix*, from the two zoological provinces of North America, which differ entirely from each other. On the Pacific slope the bulk of the shells are banded, and belong to the sub-genus *Arionta*. The Atlantic slope develops also characteristic genera in *Mesodon*, *Polygyra*, and *Triodopsis*, which are almost peculiar to the Western Hemisphere. Microscopes were brought into requisition by Mr. F. Emsley, who showed Stentors, and by Mr. S. S. Peat, who brought fern spores, and the flower of London-pride. Mr. James Abbott sent a caterpillar (*Ourapteryx sambucaria*) to be named. A number of other objects were exhibited.

251ST MEETING, June 12th, Mr. James Abbott, president, in the chair.—A paper was read on “The Comparative Anatomy of the Nose,” by Mr. Frederick Greenwood, M.R.C.S.E., Curator to the Leeds School of Medicine. He illustrated his subject with a large number of skulls of man and various animals, and by diagrams of the soft structures.—WM. DENISON ROEBUCK, Sec.

MIRFIELD NATURALISTS' SOCIETY.—Meeting June 2nd, Mr. Kaye in the chair.—74 plants were produced and named, among those in bloom were the following :—*Actaea spicata*, *Viola palustris*, *V. sylvatica*, *Stellaria nemorum*, *Genista anglica*, *Orchis morio*, and *Lysimachia nummularia*.—E. STOCKS, Hon. Sec.

OVENTON NATURALISTS' SOCIETY.—Monthly meeting, Mr. T. Scott, president, in the chair.—A number of specimens in botany were collected by Messrs. Sheard and Downs. Mr. T. Hirst exhibited a number of birds, including pair of grouse, sparrow hawks, and one pied fly-catcher. The following migratory birds were seen by Mr. R. Earnshaw :—May 2nd, the cuckoo ; 5th, the swallow ; 7th, house martin and the sand martin.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly meeting, June 7th, Mr. S. Pottage in the chair.—Mr. Hall exhibited a quantity of birds' eggs ; Mr. Lumb, eggs and nests. Mr. Sims announced having seen *Colias edusa* at Cold Hiendly with myself. Mr. Talbot exhibited preserved specimens of *Mustela erminea* and *M. putorius*.—J. SPURLING, Hon. Sec.

YORKSHIRE NATURALISTS' UNION.—The third meeting of 1877 was held at the Royal Hotel, Wakefield, on Saturday afternoon, the 16th June, after a ramble in the neighbourhood of Nostell Priory, permission to visit which had been kindly granted by Rowland Winn, Esq., M.P., Junior Lord of the Treasury. The chair was occupied by the Rev. W. Fowler. The attendance at the meeting was over 70 in number, and included representatives from the Huddersfield, Heckmondwike, Barnsley, Wakefield, Ovenden, Holmfirth, Liversedge, Mirfield, Honley, Middlestown, and Bradford Naturalists' Societies ; the Leeds Naturalists' Club ; the Goole Scientific Society ; the York and District Field Naturalists' Society ; the Selby Naturalists' Society ; the Huddersfield Literary and Scientific Society ; the Huddersfield Scientific Club ; the Leeds Conchological Club ; the Leeds Geological Association ; and the Bradford Scientific Association. After the minutes of the Wetherby meeting had been passed, Mr. Thomas Tate applied on behalf of the Bradford Scientific Association (70 members), for admission into the Union ; and the Association was unanimously elected. The next business was the presentation of a testimonial, in the form of a microscope, subscribed for among the members, to Mr. J. M. Barber, the late secretary of the West Riding Consolidated Naturalists' Society, in recognition of the services rendered by him during his long tenure of the office of secretary. The presentation was made by Mr. C. P. Hobkirk, treasurer to the fund, who, after speaking upon the success of Mr. Barber in raising the Society from a very small beginning to its present most prosperous condition, described the instrument, which was one of Mr. Charles Collins', of London. Mr. Barber very briefly thanked the subscribers. The list of additional subscribers to the funds of the Union was read, and a vote of thanks adopted on the motion of Mr. Thomas Lister, of Barnsley, seconded by Mr. Geo. T. Porritt, F.L.S., of Huddersfield. The officers of sections then gave their reports. Mr. Wm. Prest, president of the entomological section,

reported that a number of species had been taken and observed, but the only one of any note was *Eupithecia trisignata*, taken by Mr. G. T. Porritt, F.L.S., in the wood adjoining the pool at Sharston, new to the district. A number of specimens of *Colias Edusa* were recorded. All were taken or noticed in the early part of June, of the whole of which and some others, a lengthened notice by Mr. Porritt will be given in our next issue. These bring the list up to about fourteen specimens. Mr. Joseph Wainwright, F.L.S., exhibited a number of various entomological specimens he had collected when on an excursion to Cairo, Egypt, and the Holy Land, and distributed amongst the members a large number of examples of the brilliant diamond beetle, from the above localities. Mr. Prest corrected an error which had crept into the report of the Yorkshire Naturalists' Union, in the June number of the *Naturalist*. The large web exhibited by himself and Mr. Dennis, was not formed by "*T. albipunctella*," nor from a "chocolate store," but by *Ephestia elutella*, and from a chicory warehouse. Beetles (Mr. H. Crowther) : *Pterostichus madidus*, *P. strenuus*, *Telephorus thoracicus*, *Phytonomus nigrirostris*, *Phyllobius alneti*, *Tachyerges salicis*, *Anchomenus prasinus*, *Donacia sericea*, *Gyrinus natator* and *Clivina fassor*. Dr. Parsons, of Goole, sec. of Botanical section, reported 146 flowering plants, none however, of special rarity, the following being the least frequent—*Cardamine amara*, Heath Common ; *Genista anglica*, *Viola palustris*, *Orchis morio*, Cold Hiendley ; *Anthyllis vulneraria*, Crofton, not commonly found except on limestone ; *Veronica montana*, Nostell ; *Milium effusum*, *Aira præcox*, *Helosciadium inundatum*, Sharston Common ; of mosses about 18 kinds were found on Sharston Common, among them being *Dicranum palustre*, *Aulacomnium palustre*, *Hypnum cordifolium*. The following fungi were met with :—*Agaricus tener* and *A. fascicularis*, *Marasmius Rotula*, *Phallus impudicus*, and *Reticularia umbrina*. Mr. Emmett exhibited three interesting orchids from Thorparch, viz., *Habenaria chlorantha*, *Ophrys muscifera*, and *Neottia Nidus-avis*. In the absence of the officers of the Geological section, Mr. Thomas Tate, of Bradford, who had been chosen chairman of the meeting, reported that the excursion had been confined to the middle coal measures, the "Sharston," "Nostell Top Coal," and the "Stanley Main" being the principal seams won by the numerous shafts passed. No fossils were obtained. Eastward, these measures dip under the Permian beds, the proximity of the limestone being indicated by the presence of plants characteristic of a calcareous soil. Mr. Thomas Lister, secretary of the vertebrate section, gave his report (not received). Mr. Wm. Nelson, president of the conchological section, said that 21 species and 5 varieties of molluscs had been taken, which were principally from fresh water, the hot weather necessitating this kind of collecting. The most noticeable of these were *Bythinia Leachii* and *Anodonta cygnea* var. *incrassata*. The proceedings closed with votes of thanks to R. Winn, Esq., M.P., for permission to visit Nostell Priory ; to Mr. Wm. Talbot, of Wakefield, local secretary for the meeting, and to the Chairman.

Diary.—Meetings of Societies.

- July 2. Barnsley Naturalists'.
,, 3. Bishop Auckland Naturalists' Field Club. Liversedge Naturalists'.
,, 4. Richmond and North Riding Naturalists' Field Club : Excursion to Fountains Abbey. Leeds Naturalists' Club, &c.
,, 7. Goole Scientific : Excursion to Brockerdale.
,, 10. Leeds Naturalists' Club, &c. : Paper, "Some Antiquities in Yorkshire"—Mr. E. E. Prince.
,, 11. York and District Naturalists' Field Club.
,, 12. Leeds Conchological Club.
,, 13. Huddersfield Scientific Club : Paper by Mr. Joseph French
,, 16. Yorkshire Naturalists' Union : Excursion to Rombalds Moor and Shipley Glen. Start from Shipley Station at 10 a.m., to Cottingley, Gilstead, and Baildon Moors ; Shipley Glen at 2-30 p.m. : Tea at Dining Hall, Saltaire, at 4-15, Sections at 5, General Meeting at 6 p.m., at the Saltaire Institute. Leaders, Messrs. Thomas Tate and B. Illingworth.
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N. B.—We regret that again, owing to a great pressure of matter, we have been obliged to omit several Reports, which we hope to include in our next, e.g., Selby, Nottingham, and N. Staffordshire, &c.

All communications must be addressed to the Editors, care of Mr. B. BROWN, Publisher, Huddersfield.

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Original Articles.

ON THE OCCURRENCE OF *COLIAS EDUSA* IN YORKSHIRE, IN JUNE, 1877.

By G. T. PORRITT, F.L.S.

THE recent extraordinary occurrence of *Colias Edusa* in Yorkshire seems to demand more than a passing notice. In the first place, however, perhaps it will be as well to give a complete list of the records that have been sent in, in as nearly as possible the words of our correspondents.

Leeds.—W. D. Roebuck : “Female taken at Arthington by Mr. Hewetson, of Leeds, June 3rd.” “One seen a few days later at Meanwood, by Mr. W. E. Clarke.” “One seen on Saturday, June 16th, at Adel, by Mr. Abbott, Jun.” “One seen by Mr. Edward E. Prince in Infirmary-street; and one seen at Sheepshear by Mr. John W. Taylor.” “I (W. D. R.) believe I saw one in Albion-street on June 18.” Thos. Benn, June 3rd : “My brother had the pleasure of taking in his garden at Upper Wortley, a rather fine specimen of *Colias Edusa*, which he damaged somewhat in taking, not having his net. It is a very unusual occurrence in this neighbourhood.”

Goole.—H. Franklin Parsons, June 16th : “I have seen *Colias Edusa* at Goole to-day.”

Bradford.—J. W. Carter : “I have the pleasure of recording the unusual occurrence of *Colias Edusa* at Bradford. On the 11th of June a hibernated female specimen was captured by the son of Mr. W. Keeton, in a field at Manningham, within the western boundary of the borough. Several have been seen in the district, and in localities three or four miles apart.”

Batley.—Seth Smith : “I have to record the capture of what I think a rare species in this district—*Colias Edusa*. It was taken here last Monday (June 11th) by Mr. Oscar Wildsmith. I have seen the specimen, which is a female.”

Wakefield.—A specimen at Cold Hiendley by Messrs. Sims and John Spurling. A specimen at Netherton, near Middlestown, by Mr. George Jackson.

Huddersfield.—S. L. Mosley : “A specimen at Primrose Hill on June 3rd.” G. C. B. Madden : “A specimen in the Vicarage garden at Armitage Bridge, early in June.” G. T. Porritt : “Mr. Richard Jessop exhibited a specimen he had taken at Cockley Hill Top, Kirkheaton, at the Huddersfield Naturalists’ Society’s meeting, June 18. Several others were recorded at the same meeting as having been taken in the district. One seen by Mr. John Conacher, jun., in the Park, on June 3rd. I believe I saw one in New-street, in the first week in June. A deep-yellow butterfly was flying out of reach, which at once struck me as being *Edusa*, although at the time I had not heard of a specimen having been taken or seen. One seen by Mr. James Varley in Almondbury Bank, July 1st; two by Mr. Walter S. Varley in Almondbury Bank, early in June.”

Scarborough.—William Robinson : “It will interest entomologists to hear that I have seen two specimens of *Colias Edusa* during the recent warm weather. The first, a fine female, on the 3rd of June, and again another female in my own garden here on the 9th. The latter was too bright in colour to suppose it had hibernated; and yet, though I have often taken the insect in the south of England, I never before saw one earlier than in July. On the 4th inst., with a party of excursionists at Harwood Dale, eight miles from Scarborough, I met with *Vanessa Antiopa*, a good specimen, but a little old-looking. I failed to capture the insect, owing to its crossing a river, after a chase of five minutes, and being without net; but I had many near views.”

Wath.—One by Dr. Payne, of West Melton, near Rotherham, early in June.

Ilkley.—One recorded in *Entomologist* of July, by Mr. Bernard Hartley, of Pontefract. George Roberts, of Lofthouse, Wakefield : “I caught a female specimen of *Colias Edusa* on June 30th, near Bolton Abbey.”

Richmond.—G. P. Harris : “On June 20th, I distinctly saw *Colias Edusa* fly over the Richmond Cricket Ground; I had no net with me, but I watched it carefully, and satisfied myself of its identity. Others saw it besides myself.”

This list gives records of more than two dozen specimens for the county, most of which are from the West Riding. When we state

that probably as many occurrences in all have not been noted on our coal measure formations for as great a number of years, some idea will be gained of the importance of this extraordinary visitation. We are quite aware, however, that its significance has been somewhat detracted from since we promised (in our last number) to write this paper, by the fact that our county is by no means isolated in this respect. The butterfly has indeed occurred in unusual numbers all over England, and has absolutely swarmed in the southern counties. The following extracts from letters of correspondents will probably be interesting, as bearing on the point :—

From Mr. C. G. Barrett, Pembroke, dated 28th June, 1877 : “I have seen *Colias Edusa* nearly every day lately, and the earlier specimens were most splendid, both larger than those of last autumn and perfectly fresh. I am satisfied that they had not hibernated in the perfect state.”

Mr. Joseph Anderson, jun., of Chichester, date June 25th, 1877 : “*Colias Edusa* absolutely swarms here; whichever way one may walk, it turns up. Two specimens, males, which I have in my cabinet have the hind wings suffused with a shining rosy purple, much resembling (save that it is rosier) the colour of *Apatura Ilia*. I should be glad to know if it is of common occurrence; for myself I find it quite the reverse. I and my brother have taken numbers of this insect, but these are the only two specimens with this most beautiful tint and lustre.” In another letter of July 4th, Mr. Anderson, writing of the insect, says :—“Amongst the numerous females I secured two varieties, one a remarkably fine specimen, intermediate between the ordinary orange form and *Helice*.”

The two entomological journals (*Entomologist's Monthly Magazine* and *Entomologist*) of July also contain numerous records of the excessive abundance of the species in all parts of the country.

Perhaps the most interesting problem arises out of the circumstance that *Edusa* has always been considered an *autumn* species, and the odd specimens which have hitherto turned up in spring have been regarded as hibernated examples of the autumn brood. The other question which requires answering is—How is it that the species has appeared in such numbers in our own county, when in scarcely any locality has it been observed for years, and then only single examples, whilst in some districts this is the first time of its known occurrence? I am inclined to think that Mr. Robt. M'Lachlan, F.R.S., has solved the first problem. He says (*E. M. M.*, July, p. 40) : “This is about the last insect I should have expected to find in my garden at this

time of the year (at Lewisham). Truth is certainly sometimes 'stranger than fiction.' It is often supposed that stray examples captured in the spring have hibernated. Possibly this may sometimes be the case, but some other explanation must be sought for the present anomalous (for England) appearance. Either they are examples that should have come out last autumn, but were checked by uncongenial weather, or they have remained in the pupa state for a protracted period, or perhaps there is a little of both these causes. To my idea the latter may probably be the more potent of the two, if both time and *place* be taken into consideration. I have this June seen more *C. Edusa* here in two days than in eight years, even at their usual period. The present apparition shows us how little we really know of the habits of our species of *Colias*."

The other fact is possibly accounted for through the immense numbers which have appeared in the southern counties. It seems very likely that out of so many, a number must necessarily get scattered abroad, in a variety of ways, and thus get distributed over the country. It may be objected to this, that many known abundant species in the south are never seen in the northern counties; but, if examined, this will probably be found to apply only to such species as seldom fly many yards from the spot on which they were born, &c., whilst *Edusa* is strong on the wing, and of a decidedly wandering disposition. I confess this explanation is by no means altogether satisfactory, but it is the best I can give. Certainly I cannot for a moment think the Yorkshire specimens were born in the county, or have even hibernated in it, as no one seems to have seen a specimen last autumn.

TWO UNRECORDED LINCOLNSHIRE PLANTS.

BY F. ARNOLD LEES, F.L.S.

I HAVE to-day had the pleasure of gathering, within a mile of Rasen, two plants, *Pyrola minor*, Linn., and *Carduus pratensis*, Huds., by no means common or well known to West Yorkshire botanists, and both of which have not hitherto, according to the records of Topographical Botany, been found in Lincolnshire and recognised as natives there, although both of them are so most undoubtedly. The pretty waxen-bellied *Pyrola*, the Lesser Winter Green, occurs in some plenty in the shady turf of the fir-woods around Market Rasen; the *Pinus sylvestris* flourishing famously and covering large areas upon the red sandy soil

of the Neocomian greensand strata that in North Lincoln lie immediately to the west of the chalk wolds. It is the same *Pyrola minor*, L., that grows at the Copley end of the North Dean Wood, near Halifax, and that has been so often confused with, and wrongly published in plant-lists as *P. media*, Swartz. The short straight style is the best character by which to differentiate them. It is only just as long as the stamens, and even when the bloom has reached perfection is included and hidden by (instead of projecting beyond as in *media*) the incurving waxy petals that close over it. The flowers are scentless, and would appear to be self-fertilised for the most part, since I have been unable to detect them to be visited by insects in the day-time ; and although each individual bloom is somewhat proterandrous (that is, the anther pollen floury and ripe before the stigmatic surface is ready for the reception of the pollen), yet the closed petals serve to prevent the escape of the pollen, or the access of pollen from contiguous blooms.

The *Carduus pratensis*, Huds. (*Cirsium Anglicum*, Lamk)—the marsh plume-thistle, is a rare, but handsome single-headed species, and, unlike all the other British members of the genus save its compeer of the mountains the melancholy thistle (*C. heterophyllus*), it is unarmed and not prickly. It would seem to be local in Lincolnshire as in other counties ; for, so far, I have come across it only in one place—bordering a deep, wet, grassy ditch dividing the high road from the fir wood upon the right-hand side of the Walesby road, half a mile out of Market Rasen. It is to be found at intervals for some few hundred yards, and in this shady situation grows much taller (three to five feet high) and slenderer than I ever saw it in Yorkshire. In the West Riding, *C. pratensis*, Huds., is a rare plant, known as certainly occurring only in the marshy meadows around Askham bog, near York, by the Aire, below Castleford, about opposite Fairburn, and about Potteric Carrs, Doncaster. An old record of the Rev. W. Wood's, in the *Botanists' Guide*, of Turner and Dillwyn, gives it as growing “between Goole and Thorne, with *Peucedanum palustre* and *Myrica gale*.” I have sought it there in vain, though I have found both the others thereabouts ; and I am not aware that for this locality the plant has found recent confirmation at other hands. In the first edition of “Huddersfield : its History and Natural History,” it was erroneously given as a plant of the district. The trivial name “pratense” is a bad one : young botanists frequently *think of* and call the common creeping field-thistle, or the equally common marsh thistle, by the same name ; and both these—*arvensis* and *palustris*—

now and then are to be found in badly-drained meadows. Both, however, are prickly, and few botanists seem to take the trouble to distinguish them by the fission of the corolla-limb, although nothing is easier.

NOTES OF BIRDS, CHIEFLY SPRING MIGRANTS, IN BARNESLEY AND SOUTH YORKSHIRE DISTRICTS.*

By T. LISTER.

THE wheatear: first report we have received of this earliest spring visitant in South Yorkshire, is March 30, and on Greetland Moors, March 24. The chiff-chaff, second in arriving as a general rule, was noted this year the first at Crigglestone, March 28; again on April 1; also during the Yorkshire Naturalists' Union excursions on Easter Monday. Sand martin, March 31 and April 6. Cuckoo, near Thorne, 20 miles south, heard on Easter Monday; near Bretton, April 3; Hemsworth, April 8. Willow-wren, April 2 and 6; yellow or Ray's wagtail, April 4 and 9; whinchat and whitethroat, April 6; swallow, Hemsworth, April 8; house-martin, April 10; tree-pipit, April 11 and 12; redstart, April 13 and 18; sedge warbler, April 14 and 23: lesser whitethroat, April 18 and 23; grasshopper warbler, April 24; blackcap warbler, April 30; land-rail or corn-crake, May 3; swift, May 7; grey or spotted flycatcher, May 11; sand-piper, May 13; wood-wren, May 14.

I have no report yet of the garden-warbler, nightingale, goat-sucker or night-jar, and pied flycatcher (which occur locally in this district). We have little doubt the above have arrived where accurate observers have looked out for them.

The birds named are nearly all the migrants from southern countries, occurring in Yorkshire, as shewn in Talbot's list. Of those migrating northwards, redwings were seen April 17, and fieldfares, about 2000 seen in Cannon Hall park as late as May 1. Brent geese were seen by me flying north, April 24; other swimmers and waders have been seen by day, or heard by night. Canada geese have bred at Worksborough reservoir, also at Nostell and Walton Lakes, with many other water birds. Mr. Hailstone, of Walton Hall, who strives to bring back these interesting tribes to their former numbers in Waterton's

* In the exceptionally early cases, two dates are given to aid in forming a fair estimate of the time. The main bodies came unusually late, except chiff-chaff, willow wren, and tree pipit. Some of the early dates refer to individual instances.

time, writes to inform me that on the 10th and 11th they were visited by the sea swallow or tern (*Sterna hirundo*) playing over the lake and diving for fish.

We have herons on our pools and streams ; we trust they will again return to Walton, and form as noble a herony as that which is now a thing of the past.

We have reports of kingfishers, kestrels, sparrow-hawks, owls, creepers, goldfinches, linnets, although sad havoc is made of them by gun and snare. Bird-catchers think the linnets are not protected ; they should be warned that they are in the Birds Protection Act under the name of "redpole," also the goldfinch, kingfisher, nightingale, and other feathered favourites.

Rainfall for June.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL. TO DATE.		Date of heaviest Fall.	Amount of heaviest fall.
				1877.	1876.		
Huddersfield (Dalton)..... (J. W. Robson.)	350	1.74	11	18.88	14.23	1st	0.68
Wakefield.....(F. Hill.)...	...	1.75	10	16.06	...	2nd	0.47
Leeds ... (H. Crowther.) ...	153	1.29	...	14.93	...	1st	0.39
Barnsley .....(T. Lister.) ...	350	1.72	11	17.59	...	26th	0.36
Ingbirchworth ... (Do.).....	853	2.10	11	22.28	...	1st	0.70
Wentworth Castle (Do.).....	600	1.98	9	...	...	12th	0.78
Goole... (H. F. Parsons.) ...	...	1.68	...	11.45	...	12th	0.98

Short Notes and Queries.

Colias Edusa.—In Somersetshire, butterflies have been more plentiful this season than for many years, *Cynthia Cardui* and *Colias Edusa* being especially frequent. In a walk over the Mendip Hills on June 29th, I saw about eight specimens of the latter insect.—H. F. PARSONS, July 13th, 1877.

Colias Edusa AT SALTAIRE.—Mr. John Firth captured a fine female specimen of this rather scarce butterfly, in a cornfield opposite Saltair Park, June 24th, 1876.—H.T.S.

WETHERBY COLEOPTERA.—Having had occasion to go to Wetherby on the Thursday following our Whit-Monday excursion, I had an opportunity of taking several beetles, of which I enclose a list:—*Aphodius fossor*, *A. testudinarius*, *A. prodromus*, *Hister sinuatus*, *Sphaeridium scarabaeoides*, *Phyllobius uniformis*.—H. CROWTHER.

Carabus nitens AT RICHMOND.—On May 2nd I found *Carabus nitens* here, just in the kind of locality given by Rye. I think it is new to this part.—G. P. HARRIS, Frenchgate, Richmond, Yorks., July 9th.—[*Carabus nitens* is not uncommon on the moors round Huddersfield, some seasons.—Eds. Nat.]

NESTS OF HOUSE MARTIN.—Mr. J. E. Palmer mentions in the “*Naturalist*” (vol. 1, p. 29) a curious martin’s nest which he had observed near Malham Tarn. I was at Malham Cove last July (1876), and I noticed a small colony of martins had built their nests a considerable distance down the sides of the rocks, and what was more curious, a few of the nests were not domed. One nest particularly struck me as being remarkable. It was built behind a few loose stones at a considerable distance from the ground, and looked like the nest of a sand martin, only it had two apertures leading to it—an upper one which entered somewhat obliquely, and a lower one which opened downwards. The old birds almost invariably entered by the upper orifice. In the course of my reading, if my memory serves me, I have read of one or two instances of small colonies of house martins having built those domeless nests in such localities as Malham Cove. Perhaps the reason for so far deviating from their usual habits in the construction of their nests is to be found in the fact that as such situations are away from the breeding haunts of the house sparrow (which is a most inveterate and intolerable foe to the house martin), they breed in halcyon security, and therefore find domed nests altogether useless.—E. P. P. BUTTERFIELD, Wilsden, June 16th.

NAMES FOR THE NORFOLK PLOVER (*Odicnemus crepitans*).—The name of “Thick-knee” is objectionable, because it is not correct to speak of the tarsal joint as a knee, and, besides, I have never observed any particular thickness in it; but in young birds I have noticed that the upper part of the tarsus was swollen. The name of “Stone Curlew” is no whit better, seeing that the bird is not a curlew. “Norfolk Plover” is its best and most correct English designation, as associating with it the name of the county in which it is and long has been the commonest.—J. H. GURNEY, Jun., Northrepps Cottage, Norwich.

Reports of Societies.

BARNESLEY NATURALISTS’ SOCIETY.—Meeting July 2nd.—The president, Mr. T. Lister, exhibited a collection of finely-marked small serpents, locusts, and other creatures, from South Africa, brought him by Sergeant Dillon. He stated that the nightingale had been heard as near as one

mile from the town, by an old observer. It was missing after a few days, supposed to have shifted because of so many disturbers. Mr. J. Goodyear exhibited *Colias Edusa*, taken in June. The circular for the proposed museum or grounds given by F. V. Wentworth, Esq., was approved. The president gave an account of the excursion to Nostell, and the meeting at Wakefield. He reported 24 species of resident birds, amongst which were the carrion crow chased by lapwings, the jackdaw, rooks, wood pigeon, three species of linnet, missel thrush, song thrush, blackbird, yellow hammer, chaffinch, meadow pipit, pied wagtail, starling, skylark, great, blue, and marsh tits, robin, wren, dunnock, and tree sparrow. Of summer migrants, 17 species: the common and lesser whitethroat, swallow, swift, house and sand martin, tree pipit, garden warbler, black-cap, wood and willow warbler, chiffchaff, whinchat, sedge warbler, redstart, cuckoo, and Ray's wagtail. Of other animals, only the shrew and newt were noticed. The reports of flowers, insects, shells, and mineral beds were detailed to the meeting.

BISHOP AUCKLAND NATURALISTS' FIELD CLUB.—Monthly meeting, 3rd July, the president, Mr. Joseph Duff, M.P.S., presiding.—A letter was read from Mr. R. Calvert announcing the capture during the month of June of several specimens of *Colias Edusa* at Walsingham, and on the Flatts Farm, near Bishop Auckland. Addresses in reference to the field day in Weardale were delivered by the president and Mr. J. P. Soutter. Another member reported that a Roman grave had been found during some draining operations at Crofts Gate, Walsingham; it contained a skeleton, which, however, crumbled away on being exposed to the atmosphere.—THOS. WATT, Hon. Sec.

BRADFORD NATURALISTS' SOCIETY.—Meeting July 10th, the president in the chair. The evening was devoted to conversation and exhibition of specimens; amongst them were *Habenaria chlorantha*, *Geranium pyrenaicum*, *G. phænum*, *Sagittaria sagittifolia*, *Lithospermum officinale*, *Enanthe crocata*, *Ornithopus perpusillus*, &c. Entomology: *Hadena thalasina*, *Chelonia plantaginis*, *Anarta myrtilli*, *Scodionia belgiaria*, *Amphydasis betularia* (black var.)—H. T. S.

BURY NATURAL HISTORY SOCIETY.—Monthly meeting, July 3rd, the president, Mr. R. H. Alcock, F.L.S., in the chair.—Mr. Waddington gave a very interesting discourse on the microscope; Mr. Alcock exhibited *Lysimachia thyrsiflora*, a new plant in this district; Mr. G. Greenhalgh, *Jasione montana*, *Silene inflata*, and *Valeriana officinalis*; Mr. Kaye, a mounted specimen of the common snipe (*Scolopax gallinago*) and the moth *Deilephila lineata*, taken at Peacock Hall, near Gigg, being the second of that species known to be taken in this neighbourhood; and Mr. Hall, *Hadena glauca*, taken in Birtle—a new insect in this neighbourhood.

GOOLE SCIENTIFIC SOCIETY.—Excursion to Wentbridge, July 7th.—The party drove from Knottingley to Wentbridge by way of Darrington, and then walked down the picturesque valley called Brockerdale as far as

Smeaton Crags. Wentbridge is situated on the edge of the coal measures, at the foot of a range of low-wooded hills formed by the escarpment of the magnesian limestone. At this point the little river Went cuts its way from the west through the limestone range, in a narrow valley with steep wooded and rocky sides. The slopes of this valley are the habitat of a rich and characteristic limestone flora, including several species of considerable rarity. The attention of the party was therefore chiefly given to botany, with the following results:—Flowering plants, 184 species, including *Geranium columbinum*, *Hypericum montanum*, *Astragalus hypoglottis*, *Onobrychis sativa*, *Spiraea Filipendula*, *Potentilla verna*, *Asperula cynanchica*, *Inula conyza*, *Erigeron acris*, *Campanula glomerata*, *Ophrys apifera*, *Epipactis latifolia*, *Sclerochloa rigida*, *Bromus erectus*, and *Brachypodium pinnatum*. Ferns, 5. Mosses, 37, including *Weissia verticillata*, *Tortula tortuosa* and *nitida*, *Didymodon luridus*, *Encalypta vulgaris*, *E. streptocarpa*, *Fissidens adiantoides*, *Anomodon viticulosus*, *Isothecium myurum*, and *Hypnum riparium* (fr.), *crassinervium*, *molluscum*, *lutescens*, *murale* (fr.), and *chrysophyllum*. Hepaticæ, 4, including *Madotheca platyphylla*, and *Jungermannia Wilsoniana*. Lichens, 7. Algæ, 2. Fungi, 3, including *Polyporus fraxineus* and *Dacrymyces chrysocoma*. In other departments little was done, the mollusca seen included *Helix lapicida* and *Bulinus obscurus*; birds were remarkably scarce, the blue-rock pigeon being the most noteworthy observed. Many nests of the great wood ant were seen. Several sections of the magnesian limestone were seen; the rock, which is near the base of the series, is a soft cream-coloured limestone in thick beds, with sparry cavities, like that at Pontefract. No fossils were found.—H. FRANKLIN PARSONS, Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting July 13th, in the Museum, South-street, Mr. G. T. Porritt, F.L.S., vice-president, in the chair.—Mr. James Varley exhibited a large number of ferns and flowering plants from Cleethorpes, Windermere, and other localities. Mr. George Brook, the head of a rabbit shot near Stockton, having the lower teeth protruded for towards two inches out of the mouth, and curved upwards in the manner of tusks; the upper ones were also much longer than usual, and curved sideways: it seemed curious how the animal could have taken its food and maintained such a healthy appearance. In conchology, Mr. John Conacher, jun., shewed *Anodonta cygnea*, var. *incrassata*, from Nostell, the first record of its occurrence in the West Riding, and only the second Yorkshire specimen; also *Dreissena polymorpha*, which he found attached to the above shell. In lepidoptera the chairman exhibited a series of *Herminia tarsipennalis*, reared from eggs; the specimen of *Eupithecia trisignata* taken in the Nostell excursion of the Yorkshire Naturalists' Union; a variable series of *Arctia menthastris*; black *Amphydasis betularia*, &c.; also larvæ of *Cleora glabraria*, from the New Forest. Mr. S. D. Bairstow, a box of various species taken during the last few weeks in North Wales, chiefly at Llanrwst, and including

Venusia cambricaria, *Selenia lunaria*, *Venila maculata*, *Ennychia octomaculata*, &c., &c. Mr. Varley, *E. octomaculata* from Hebden Bridge, and various orthoptera and neuroptera, from America. Two papers were then read—the first by Mr. Joseph French on “Hybridism,” in which he detailed some extraordinary results from the crossings of various species of plants and animals; the second by the chairman, “On the occurrence of *Colias Edusa* in Yorkshire, in June, 1877.”

LEEDS CONCHOLOGICAL CLUB.—Readers, by referring to page 126, vol. II. of the “Naturalist,” will find an interesting account of the above society. The 150 “Yorkshire Locality Records” there mentioned have increased to 487, and the 66 species and varieties to 103, betraying, although no mention has been made for some time of the doings of the club, anything but a quiescent condition, and not only has this part been pushed forward, but microscopical demonstrations of the functions of the cilia of the mussel and the construction of the lingual ribbons of molluscs, have been made. Of British shells occurring outside Yorkshire, and foreign ones, the exhibits have been large; of *Helices*, above 81 species have been shown; and of other genera a fair proportion, many being worthy of special mention, did not space forbid; we cannot omit, however, *Clausilia biplicata*, var. *Nelsoni*, collected and exhibited by Mr. J. W. Taylor, and named by Dr. Jeffrey thus in honour of Mr. Wm. Nelson, the president of the club. A loss too has been felt by the resignation of Mr. W. D. Roebuck as secretary, who, from want of time, felt himself inadequate to attend to his duties. Mr. Hy. Crowther was elected in his stead. Another important item in the programme and progress of the club has been a division of the meeting night,—giving part of the evening to locality records and exhibition of shells of any kind, and part to the reading of papers on genera or species of shells. On May 31st, the first of these was read by Mr. Hy. Crowther, on “*Bulimus acutus*,” illustrated by examples gathered by himself in Dublin. On June 14th, Mr. J. W. Taylor read a paper on “*Helix caperata*;” in this excellent paper the author set forth the experience of himself and others in the resolution of this species into the types and varieties of many authors, illustrating by means of maps its distribution, and by drawings the arrangement of the jaw. On July 12th, the president read a paper on “*Limnaea peregra*.” When it is remembered that he is an authority on *Limnaeidae*, the members naturally looked forward to an excellent paper—an expectancy which was fully realised; the habits, distribution, and variations were strikingly pictured; he exhibited no less than 84 tablets of *Limnaea peregra*, and several other species approaching it in form, referring to them constantly in elucidation of his theories and remarks.—**Hy. CROWTHER, Hon. Sec.**

LANCASHIRE WORKING MEN'S BOTANICAL ASSOCIATION.—Eighth annual meeting—There was a large attendance of representatives from the various societies belonging to the association. Mr. R. H. Alcock occupied the chair, and in a brief address said the work of the Lancashire botanists

was one of great interest, not only in this neighbourhood but throughout the kingdom. Some really good work had been done by them, and in some respects it was of a rather different kind to the work accomplished in years gone by, for now they had railways and every means of going about the country. Great interest was now taken by local botanists in the sedges, and although it was only three years since the seventh edition of the London Catalogue was published, yet there had been since that time a new one discovered (*Carex ornithopoda*), a specimen of which he had in his herbarium, and which was given to him by a friend. Among the plants exhibited were *Geranium phænum*, *Hippuris vulgaris*, *Ligusticum scoticum*, *Sambucus Ebulus*, *Pyrola rotundifolia*, *Atropa Belladonna*, *Utricularia minor*, *Hottonia palustris*, *Glaux maritima*, *Samolus Valerandi*, *Altosorus crispus*, *Asplenium lanceolatum*, *Lastrea thelypteris*.

LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—252nd meeting, June 26th, Mr. John Grassham, V.P., in the chair.—Mr. H. Pollard presented to the local collection three large specimens of *Anodonta cygnea*, from Shepherd's Pond, and three specimens of *Unio tumidus*, var. *radiata*, from the Wakefield and Barnsley Canal at Agbrigg. Mr. H. Crowther presented two beetles from Agbrigg, *Clivina fossor* and *Donacia sericea*. Mr. W. Nelson exhibited *Vertigo pygmæa*, from Clapham and Went Vale; *Carychium minimum*, *Planorbis nautilus*, and *Physa hypnorum*, from the Birmingham district; and *Planorbis dilatatus*, from the canal at Manchester. Mr. H. Pollard exhibited the shells collected at Agbrigg on the occasion of the Union excursion to Nostell Priory. Mr. John Wm. Taylor showed a number of helices characterising different regions, as *Anastoma* from Brazil; *Helix Waltoni* from Ceylon; *H. sepulchralis* from Madagascar; *H. Fraseri* from Australia; and *H. xanthocheila*, *H. aphrodite*, *H. pulcherrima*, and *H. iota*, from the Philippines. He also showed *Scalaria pretiosa*; also a lively specimen of the stag beetle (*Lucanus cervus*) from Hammersmith. Mr. John Grassham showed *Saturnia pyri*, *Bombyx cynthia*, and *B. cecropia*. Mr. Charles Smethurst showed *Dianthæcia capsophila*, from the Isle of Man, black varieties of *A. betularia*, and a number of American lepidoptera, including *Cynthia Huntera*, *Danais archippus*, *Deiopeia pulchella*, *Bombyx polyphemus*, and *B. cecropia*. Mr. Benjamin Saynor showed under the microscope, with dark ground illumination, *Hydra viridis*, reproducing itself by budding. Mr. F. Emsley exhibited with the microscope a longitudinal section of a piece of oak of immense size, which was found the previous week in digging for the main sewer in Kirkstall Road, Leeds.

253RD MEETING, July 3rd, Mr. James Abbott, president, in the chair.—Mr. Charles Smethurst exhibited *Dolomedes mirabilis*, a spider; *Coccinella 22-punctata*, and *Strangalia armata*, coleoptera from Bishop's Wood; also *Ptinus crenatus*, beetles from the Isle of Man. From a recent concho-logical ramble on Cooper's Hill, Gloucestershire, Mr. Wm. Nelson brought and exhibited *Clausilia laminata*, var. *albida*, and *C. Rolphii*. Under the

microscope were exhibited by Mr. B. Saynor, *Volvox globator* and a section of fossilized pine; by Mr. F. Emsley, the larva of the common gnat, *Culex pipiens*. Mr. J. W. Westmoreland brought several specimens of common plants; by Mr. J. W. Taylor, a piece of crocodile's skin (tanned), and a collection of helices and their varieties, from Oregon, Idaho, and Lower California, which included *Helix fidelis*, *H. infumata*, *H. Townsendiana*, *H. areolata*, and *H. Idahoensis*. The specimens of *H. fidelis* showed its approach in its variation to *H. infumata*, whilst in the Oregon type specimens of *H. Townsendiana* we had a heavy and calcareous texture; the varieties from Idaho were horny. *H. Idahoensis* is a distinct and unique shell, having strongly-developed and transverse ribs encircling the whole.

254TH MEETING, July 10th, Mr. James Abbott, president, in the chair.—Mr. Edward E. Prince read a paper entitled "Notes on the Geology and Antiquities of Dorsetshire," illustrated by diagrams.—WM. DENISON ROEBUCK, Hon. Sec.

255TH MEETING, July 17th, Mr. John Grassham, V.P., in the chair.—Mr. Charles Rider brought and described a skeleton of the frog, *Rana temporaria* which he had prepared. Mr. C. Smethurst exhibited the following moths from Bishop's wood:—*Lomaspilis marginata*, *Eupithecia venosata*, *Scotodia undulata*, and *Melanthis albicillata*; also Coleoptera from Ilkley—*Clivina fossor*, *Harpalus ruficornis*, *Calathus melanocephalus* and *Nebria brevicollis*. Mr. Hy. Pollard showed from Saltwick, near Whitby, a quantity of fossils he had gathered, the principal were *Nucula ovum*, *Avicula decussata* and *Gryphaea incurva*, also recent shells, *Sphaerium rivicola* from Shipley. Mr. Henry Crowther exhibited a poplar hawk moth from Mapplewell, near Barnsley, and an extremely marked specimen of *Strangalia armata*, a beetle; he next exhibited, and read a paper descriptive of the habits, &c, of *Dolomedes mirabilis*, a spider, followed by another paper on the stag beetle (*Lucanus cervus*) showing the insect alive: also the following species of coleoptera from typical genera of the Lamellicornes, to illustrate its position in that division:—*Phyllopertha horticola*, *Melolontha vulgaris*, *Serica brunnea*, *Hoplia philanthus*, *Geotrupes stercorarius*, *Aphodius fossor*.

MIRFIELD NATURALISTS' SOCIETY.—Monthly meeting, 7th June.—Mr. Joseph Tindall, of Huddersfield, gave an address on "The Geographical Distribution of Birds." Between 50 and 60 plants were produced in bloom, among which were *Genista tinctoria*, *Oenanthe crocata*, *Scutellaria galericulata*, *Aegopodium podagraria*, and *Chenopodium bonus Henricus*.—E. STOKS, Sec.

SELBY NATURALISTS' SOCIETY.—28th meeting, May 30th.—The first excursion of the season was made to Everingham, the seat of Lord Herries. Most of the time was spent in the park, gardens, and hothouses, the exotic plants and ferns in the latter proving a great attraction to the

members. The most noteworthy plants found were *Colchicum autumnale*, *Convallaria majalis*, *Orchis mascula*, and *Listera ovata*.

STAINLAND NATURALISTS' SOCIETY.—Monthly meeting at Burwood, Mr. Wilson in the chair. The following specimens were exhibited by Mr. B. Garside :—Musk parrot, greenleek parrot, swift parrot, and emu's egg from Australia, eggs of the moorhen, lesser redpole, and eight sparrow hawks' eggs, laid in two batches in the same nest by one pair of birds on the 13th of May and 6th of June. There was a good table of local flora collected by Messrs. Stott, Hanson, Edwards, and Smith, amongst which were the following :—*Scutellaria galericulata*, *Anchusa sempervirens*, *Botrychium lunaria*, &c.

MONTHLY MEETING, the president in the chair. The arrivals of the later migrants were given in as follows ;—Greater whitethroat, sedge warbler, May 13th; spotted flycatcher May 20th; Mr. Garside exhibited eggs of the sparrow hawk, not known to have nested in this district during the last thirty years. The female subsequently deposited four more eggs in the same nest. Papers were read by Messrs. H. Wilson and B. Noble.—W. HY. STOTT.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Meeting June 20th, Mr. T. W. Wilson in the chair.—The secretary, Mr. Prest, exhibited specimens of *Ephestia elutella*, bred from larvæ found feeding on chicory, and also from currants : this forms a sequel to the very interesting exhibition of a large sheet of web, formed by larvæ, at the Wetherby meeting of the Yorkshire Union : also living larvæ of *Polia flavocincta*, and cases of *Coleophora palliatella*, taken on oak at Bishop's Wood. Mr. R. Cook, bred specimens of the following species :—*Amphydasis betularia*, both black and ordinary forms, *Ptilodonta palpina*, and *Notodontia camelina*, *dromedarius*, *ziczzac*, and *dodonæa*. Mr. Wm. Simmons, bred specimens of *Eupithecia consignata*, *Notodontia carmelita*, and *Noctua neglecta*. Mr. G. C. Dennis, also specimens of *Ephestia elutella*, bred from chicory, and bred *Mania typica*. Mr. J. Ripley, a fine male specimen of the hoopoe (*Upupa epops*), shot at Tockwith, near York, and an albino specimen of the common starling (*Sturnus vulgaris*), taken at Holtby.—W. PREST, Hon. Sec.

MEETING July 11th, Mr. William Chapman in the chair.—Mr. William Simmons exhibited bred specimens of *Nyssia Hispidaria* and *Cymatophora ridens*. Mr. R. Cook, bred specimens of *Dicranura furcula* and *bifida*, and *Acronycta megacephala*. Mr. G. C. Dennis, bred specimens of *Tortrix sorbiana*, *podana*, and *Spilonota ocellana*; also splendid specimens of three species of silk worm from pupa sent to him. Mr. W. Turner, specimens of *Smerinthus ocellatus* and *populi*. The Secretary then exhibited a fine lot of larvæ taken by himself during the society's excursion to Bishop's Wood, Cawood, in June last, and finely preserved by Mr. Doncaster, of Sheffield. Amongst them were the following : *Theclæ Quercus*, *Phigalia pilosaria*, *Pæcilocampa*

populi, *Cymatophora diluta*, and *flavicornis*, *Taeniocampa populeti* and *Tethea subtusa*; also the following bred species, *Eupithecia pimpinellata* and *tenuiata*, *Tortrix braunderiana*, and *Plodia interpunctella*.—W. PREST, Hon. Sec.

YORKSHIRE NATURALISTS' UNION.—The fourth excursion and meeting for this year was held on Saturday, the 14th July; the district for investigation being Shipley Glen and Rombalds Moor. Parties started in the morning and afternoon in different directions under the leadership of Messrs. Tate, Illingworth, &c. About 150 members attended. After tea in the Saltaire Dining Hall, the sections met in the various class rooms of the Saltaire Institute. The general meeting was held in the Lecture Theatre of the Institute, the president, the Rev. Wm. Fowler, M.A., in the chair.—The Societies not represented were:—Ripponden, Holmfirth, Rastrick and Brighouse, York and District, and Sheffield. After the minutes of the Nostell Meeting had been passed, the list of additional subscribers to the funds of the Union was read and a vote of thanks adopted on the motion of Mr. Geo. Brook, ter; seconded by Mr. G. T. Porritt, F.L.S., of Huddersfield. The officers of sections then read their reports. Dr. Parsons, Secretary of the Botanical Section, reported that for that section the present had been by far the most successful excursion yet made this season, the number of flowering plants and ferns observed having been 260, as against 146, 136, and 40 at previous meetings. This was to be attributed partly to the floral wealth of the neighbourhood, partly to more species being out at this season than earlier in the year, and partly to the large extent of country explored, different parties having taken different routes. The principal finds were, on Rombalds Moor, *Vaccinium Vitis-Idaea*, *Trientalis europaea*, *Empetrum nigrum*, *Eriophorum vaginatum*, *Scripus setaceus* and *Carex curta*; at Hawksworth, *Genista tinctoria*, *Habenaria chlorantha* and *Crepis paludosa*; at Shipley Glen, *Hypericum Androsceum*, *Euonymus europaeus*; at Gilstead Lock, *Geranium pyrenaicum*; at Manningham, *Humulus Lupulus*; on Hope Hill, *Ophioglossum vulgatum* and at various places in the valley between Bingley and Shipley, *Stellaria nemorum*, *Lactuca muralis*, *Campanula latifolia*, *Corydalis claviculata*, *Myrrhis odorata*, *Sagittaria sagittifolia*, *Prunus Padus*, *Salix pentandra*, *Equisetum sylvaticum*, *Bromus secalinus*, *Asplenium Ruta-muraria*, *Scolopendrium vulgare*, *Linaria Cymbalaria*, *Geranium phœnum*, *Sanguisorba officinalis*, *Geum rivale*, *Senecio erucifolius*, *Polygonum Bistorta*, *Allium oleraceum*, *Potamogeton polygonifolius* and *P. pectinatus*. The discovery of *Trientalis europaea* was particularly interesting and satisfactory, as this beautiful little northern plant has not, we believe, been seen on Rombalds Moor for many years, and was feared to be extinct. One small patch only was found, and it was in flower but very sparingly. A very large number of mosses, hepaticæ and other cryptogamia were found, but time did not allow them to be examined at the meeting. Mr. T.

Tate, chairman of the Geological Section reported that the excursion was chiefly confined to the Millstone Grit series underlying the coal measures. The northern limit of the lower coal measures is bounded by the River Aire, the outcrop of the coal seams running roughly parallel with its southern bank. An outlier of these measures, cut off by denudation, forms an elevation to the east of Shipley Glen, called Hope Hill, 926 feet above sea level. The outcrops of the Halifax soft and hard coal seams were traced along its slopes, capped by the eighty yards band rock, a bed of sandstone to whose protective influence the preservation of this outlier is due. The Millstone Grits with the overlying soft bed shales are of freshwater origin, while the shales of the hard bed indicate Marine conditions. We have a good example of denuding agencies in the ravine scooped out by Eldwick Beck running through Shipley Glen. The Glen terrace of rough rock polished and grooved, and a pocket of Ice-till containing scratched limestone pebbles near to Eldwick Quarry, prove that a glacier flowed over this area during the ice age. The fossils, named by Mr. Spencer were—Soft bed : *Rhizodus Hibberti*, bones and teeth ; *Palaeoniscus*, scales ; *Psammodus porosus*, palate ; *Holoptychius*, scale ; *Anthracosia minima* ; *Cyprides*, &c. Hard bed : *Goniatites Listeri* ; *Aviculopecten papyraceus* ; *Posidonomyia minima* ; *Orthoceros Steinhaueri*, &c. Mr. Talbot (president) gave a list of birds observed by himself and other members during the excursion. Resident birds, 23 species—meadow pipit, pied wagtail and young (very numerous by the moorland streams), mountain linnet, stonechat and young, yellowhammer, corn bunting, blue tit, lesser redpole, greenfinch, bullfinch, lapwing, sparrow-hawk, starling, thrush, blackbird, and magpie. Of summer migrants only 14 species were noted—swallow, martin with young, sand martin, swift, whitethroat, blackcap, whinchat, wheatear, sedge warbler, willow warbler, tree pipit, yellow wagtail, ring ouzel (on the moors), and redstart. Of most of the above it was remarked that they were few in number, especially the warblers. In the Conchological Section, Mr. Henry Pollard (the only representative present) recorded the finding of but few shells, and those of commonly recurring kinds. Entomological Section : The report was given by Mr. G. T. Porritt, F.L.S., who said that more species of lepidoptera had been taken or observed than on any previous excursion this season. Amongst them may be mentioned—*Acidalia fumata*, *Chelonia plantaginis*, *Acronycta menyanthidis*, *Phycis carbonariella*, *Larentia coesiata*, *Anarta myrtilli*, *Bombyx quercus*, *Saturnia carpini* (larva), *Scodiona belgiaria*—all on Rombalds Moor ; *Abraxas ulmata*, plentiful in Hawksworth Wood ; *Aplecta nebulosa*, *Hepialus velleda*, *Polia Chi* (larva), *Sesia tipuliformis*, *Tanagra chærophyllata*, &c., &c. Coleoptera, Mr. H. Crowther : their paucity equalled that of the mollusca, the following being the only species exhibited :—*Pterostichus madidus*, *Otiorhynchus ovatus*, *Calathus piceus*. A vote of thanks to Messrs. Tate and Illingworth, the local secretaries, and the chairman, brought the proceedings to a close.

Diary.—Meetings of Societies.

- August 6. Bank Holiday. Yorkshire Naturalists' Union. Excursion to Goole for Thorne Moor. Leader : H. Franklin Parsons, M.D.
Tea at 4 p.m., in Board Schools, Alexandra-street. Sections at 5 p.m., in Board Schools. General Meeting at 6 p.m. Barnsley Naturalists'.
,, 7. Leeds Naturalists' Club, &c., 8 p.m. Bishop Auckland Naturalists' Club. Liversedge Naturalists'.
,, 8. York and District Naturalists' Field Club.
,, 9. Leeds Conchological Club.
,, 10. Huddersfield Scientific Club, 8 p.m.
,, 13. Huddersfield Naturalists'.
,, 14. Leeds Naturalists' Club, &c. : Paper, "On the Classification of the Protozao."—Mr. Charles Rider.
,, 18. Heckmondwike Naturalists'.
,, 21. North Staffordshire Naturalists' Field Club : Excursion to Repton
Leeds Naturalists' Club, &c.
,, 23. Leeds Conchological Club.
,, 25. Huddersfield Naturalists'. Batley Naturalists', 8 p.m.
,, 28. Leeds Naturalists' Club, &c. : President's (Mr. James Abbott) Inaugural Address.

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NO. XXVI.

SEPTEMBER, 1877.

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WANTED to borrow for a short time: "The Entomologist's Monthly Magazine" and Newman's "Entomologist," from the commencement to the year 1871. Also wanted to purchase Nos. 19 & 24 (February and July, 1877) of the "Naturalist."—WM. DENISON ROEBUCK, 9, Sunny Bank, Terrace, Leeds.

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Original Articles.

THE COLORADO BEETLE.

(*Doryphora decemlineata*.)

How long is this excitement about the Colorado potato beetle to last? Surely we have had enough of it. One would suppose that the evolutionists had now proved their case, and that a new and distinct species had been evolved. Or, has the beetle only just now taken a fancy to see a little of the world, and is travelling to England for the purpose? Or, possibly, during the last twenty years they have eaten up everything in America, and are consequently obliged to find "pastures new!"

We have never felt any alarm about this insect. We have no doubt as many have been landed on our shores every year for a long, long time, as in the present year, but as yet no very direful effect has followed. It is very difficult indeed to introduce most species (though of course there are several well-known exceptions) in any new locality, even if only a few miles away from their natural habitat, although they may be placed, to all appearance, in exactly similar spots, and under the same conditions, and we doubt very much if the potato beetle would exist here for more than a year or two, even if it were attempted to introduce it.—EDS. NAT.

RARE PLANTS IN NORTH WALES.

BY JAMES BACKHOUSE.

A WEEK or two ago, while staying in North Wales, I found a plant of *Woodsia ilvensis*, on Cader Idris, with fronds far exceeding in size the largest British specimen I ever saw or heard of. Many years ago I gathered this fern in Teesdale, in the Clova Mountains of Forfarshire, in Dumfriesshire, and on Helvellyn, but my largest examples (including the original specimen from Teesdale, found first in England by my father), do not exceed four inches in length. One of the fronds of the Cader Idris specimen is $7\frac{1}{8}$ inches long by $1\frac{1}{4}$ inch broad, a second frond is about 7 inches, and a third nearly 6 inches. Have any of your readers seen a larger? In magnitude it very nearly equals the full size of the Norwegian plant.

In the same region I was also pleased to find *Polygala alpestris*, *P. vulgaris*, var. *alpestris*, Koch., *P. vulgaris*, var. *grandiflora*? (Bab. Man. Ed. 7.)—by far the most showy of British Milkworts. I have seen the same plant on the cliffs of the Glyder Fawr, in the Snowdon district: also on crags surrounding the grand, but little visited, Llyn Dulyn, on the east of Carwedd Llewelyn range, where the cliffs drop nearly perpendicular for 1000 feet into the lake. This plant seems a true Alpine, and is, so far as I have seen, found only on the moist ledges of lofty precipitous cliffs. If identical with the Connemara plant, which grows down nearly to the sea level, it may be only a var. of *P. vulgaris*; I doubt this being the case, but hope to cultivate them both.

I also noticed the rare *Hieracium cinerascens* (Jord.), a species nearly allied to *H. pallidum*, with which it is associated; *H. Gothicum*, sparingly, and *H. argenteum*, on lofty humid cliffs. *Leonurus Cardiaca*, (L.) was met with near Towyn. *Veronica spicata*, near Barmouth and Aberdovey. *Dianthus deltoides*, cliffs at Barmouth.

I also noticed *Orobanche Hederœ*, *Lathyrus sylvestris*, in great profusion and very showy; *Rubia peregrina*, *Asplenium lanceolatum*, *Erythrea latifolia* and its var. *alba*., *E. pulchella*, and *E. littoralis*. The last named is, to my fancy, by far the prettiest of the tribe, its vivid rosy pink flowers, expanding well, and forming a compact mass, are charming.

York, August, 1877.

RECENT MOSS DISCOVERIES IN WEST YORKSHIRE.

By F. ARNOLD LEES, F.L.S.

ON the eve of publication of a first Moss Flora with any pretension to completeness, the following particulars as to the names, localities, and discoverers of those species (15 in number) which will appear for the first time as constituents in the flora, may not be uninteresting. They may serve as additional encouragement to the botanically-inclined members of the Yorkshire Naturalists' Union, to follow out the course indicated by their president in his opening address. To the lower forms of vegetable life, to the algae, fungi, &c., in preference to the higher, must their energies be chiefly directed. The distribution of the phanerogamia is fairly well known, and not a great deal remains

to be done ; but the fungi, algæ, lichens, and even the mosses, still offer a good field for investigation. The West Riding moss list includes 315 species as really occurring within the limits of the West Riding, after the careful elimination of eight " *Incognitis* " included in former lists on the slenderest grounds, and of six other species whose localities are really outside the Riding, although also inadvertently finding a place in former lists ; 314 species out of the 570 now known for all Britain, is a large proportion to have, and shows how relatively rich the West Riding is in mosses.

The species discovered in recent years, and not included in any former list, are as follows :—

1. *Sphagnum intermedium*, Hoffm.—Discovered first by Mr. John Whitehead, 1870, afterwards found on Marsden Moors, near Redbrook, by Mr. C. P. Hobkirk.

2. *S. papillosum*, Lindb.—On the moorland between Slaidburn and Clapham Station, at Bowland Knotts, by myself in company with Mr. Wm. Todd, in 1876.

3. *Androëa crassivervia*, Bruch.—On the rocks of Penyghent, at 2000 feet, by John Whitehead, in 1868. " Hebden Bridge, 1865 " (Hobk. Synopsis, p. 22) ; but although gathered prior to Mr. Whitehead's discovery of it, it could not have been determined until after the publication of the list of West Riding mosses by Mr. Hobkirk, in Journ. Bot., 1873.

4. *Weissia crispula*, Hedw.—Discovered, and recorded only, by Mr. Thomas Hick, B.A., B.Sc., on rocks near Harrogate, 1876.

5. *Tortula insulana*, De Not., *cylindrica*, Tayl.—Detected first by Mr. C. P. Hobkirk, at Grimescar Wood, Huddersfield, in 1876. Small fence of Harewood Park, near Leeds, 1871, gathered by myself and named *fallax*, which it much resembles in facies. It is probably not rare, but passed over as *fallax*.

6. *Tortula intermedia*, Brid.—First found by Mr. C. P. Hobkirk on the banks of the Nidd, above Pateley Bridge. Slaidburn, 1876, by myself, determined by Mr. Hobkirk.

7. *Grimmia ovata*, W. & M.—First found on walls in valley of Hodder, above Slaidburn, in 1876, by myself and Mr. William Todd. Determined as *ovata* by Mr. C. P. Hobkirk.

8. *Bryum roseum*, Schreb.—Discovered by Mr. T. Stansfield, in Pennant Clough, Hebden valley.

9. *Fissidens incurvus*, Schw.—Only found by Mr. T. Stansfield, on clayey banks at Royd Hills, Todmorden.

10. *Pterogonium gracile*, De Not.—Found many years ago above Austwick, by Mr. J. Nowell in company with Dr. J. Windsor, but the record has escaped the notice of subsequent compilers. On trees and stones near Low Gill, above Sedbergh.

11. *Thuidium Blandovii*, W. & M.—First found in the Riding near Malham Tarn, by Messrs. J. Percival and J. Whitehead, in 1868.

12. *Plagiothecium nitidulum*, Wahl.—Discovered by Messrs. Whitehead and Percival, in Heseltine Ghyll, Littondale, in 1861. Not previously known as a native of Britain even.

13. *Hypnum arcuatum*, Lindb.—First discovered in Hareley Wood, near Todmorden, by Mr. J. Nowell, but the record seems to have dropped from notice, as it was repeated neither in Dr. Carrington's list, nor Mr. Hobkirk's. Found by Mr. J. G. Baker, by the river Ure, opposite Hackfall, and by myself on bank of field above Hackfall—probably same place.

14. *Hypnum eugyrium*, Schw.—According to Prof. Schimper, a moss discovered by Mr. J. Nowell, at Cautley Spout cascade, up Rawthey Dale, was this species. The valley of the Rawthey wants well working bryologically and lichenologically.

15. *Hypnum umbratum*, Ehrh.—Discovered long ago by Mr. Wm. Brunton, in "Dallen Ghyll, near Ripon"—it is nearer Ripley—according to original MS. note in an old copy of Turner & Dillwyn's "Botanist's Guide," formerly belonging to Mr. Joseph Woods, but now to Mr. Frederick Townsend, to whose courtesy I am indebted for much interesting botanical material not available to the compilers of former West Yorkshire Floras. *Hypnum umbratum* has not again turned up, but as the species is not an unlikely one to have existed (or to still exist) in the Riding, such a record hardly merits an unexplained exclusion.

Postscript, August 18.—Since writing out the above, yet three other species have I had to add to the lists for the West Yorkshire Flora. They are as follows :—

1. *Dicranodontium longirostre*, W. & M., is reported to me as discovered by Dr. Parsons, at Shipley, in July last. Not hitherto known in Riding.

2. *Didymodon luridus*, Hornsch, found by Dr. Parsons in Wentvale, in July. Also new.

3. *Trichostomum nitidum*, Lindb., is also reported by the same close observer, and also from Wentvale.

I have also to modify, or rather expand, my remark upon *Sphagnum papillosum*, Lindb. I believe no one gathered it, *to know it as such*, in the Riding, before I did so in 1876 ; but since then I have ascertained that it (*S. papillosum*, in its variety *confertum*) is the commonest form on the lower moorlands, much more frequent than any other species, except *acutifolium* ! I have Dr. Braithwaite's authority for saying it is also the most frequent form in the North Riding about Whitby, as in the South of England.

COLIAS EDUSA,

IN SUSSEX, SURREY, GLOUCESTERSHIRE, MONMOUTHSHIRE,
HAMPSHIRE, AND DORSETSHIRE,

DURING THE MONTHS OF JUNE AND JULY, 1877.

By H. GOSS, F.L.S., &c.

As the recent extraordinary abundance and distribution in nearly all parts of the United Kingdom of *C. Edusa* is a phenomenon which has created so much interest, possibly my experience of the species during the past two months may be considered worth recording.

SUSSEX.—On the 8th June, when crossing Ashdown Forest, I observed several specimens of *Colias Edusa* flying across the heath in various directions. I need hardly say that from its nature and productions, this district of 20,000 acres of moorland is not one which is usually much favoured with the presence of *Edusa*, even in the autumn of those seasons in which the species is abundant on the coast. Not only on the moorland, but in the wooded parts of the forest, between Wych Cross and Forest Row, *Edusa* occurred in unusual numbers. Later on in the day I found the species in marshy fields in the neighbourhood of East Grinstead, even more common than on Ashdown Forest.

SURREY.—On the 9th of June I started for a day's collecting in woods in the neighbourhood of Leatherhead, which is about $6\frac{1}{2}$ miles from here. *Edusa* occurred along the road sides the whole distance, and was actually commoner than *Cardamines*. On entering the woods, *Edusa* rose from a patch of *Ajuga*, and I soon found that they were more plentiful than *A. Euphrosyne*, *S. Alveolus*, *T. rubi*, *V. maculata*, or any of the species usually common in woods at this period of the year, but which this season, according to my experience, did not occur in the usual numbers.

GLoucestershire.—From the 25th to the 29th June I was in the Cotswolds, where I again saw *Edusa*, but not commonly.

Monmouthshire.—On the 30th June I saw a specimen of *Edusa* in the Wye valley, near Tintern.

Hampshire.—On visiting the New Forest about the 8th and 9th July, I saw a few recently-caught *Edusa* in the boxes, or on the setting-boards, of some of the local collectors.

Dorsetshire.—From the 12th to the 20th of July I was in the Isle of Purbeck, where I found *Edusa* tolerably common along the cliffs.

The only county in which I have been during the last two months in which I did not see *Edusa*, was Herefordshire; but I was only in it for two days, and the weather at that time was not particularly favourable.

I would observe that the condition of many of the specimens was such as to preclude the possibility of their having passed the winter in the imago state, and the limpness of the wings of one of them was conclusive evidence that it had only just emerged from the chrysalis. During the last few days, specimens of the ordinary, or what this season may be called the *second*, brood of *Edusa* have begun to appear commonly. On Saturday last I saw several in woods near Strood, North Kent, and this morning I caught 34 in a field about two miles from here.

*The Avenue, Surbiton Hill,
Surrey, 6th August, 1877.*

AQUARIA.*

By G. C. B. MADDEN, B.A.

My paper claims neither originality nor yet novelty, for I simply shall endeavour to describe the general arrangements and details of the Aquarium, as seen by me at Manchester, in 1875. Naturalists have often looked with longing eyes at the mighty ocean, and desired to unravel some of the wonders which were locked up in her bosom—they longed for the power of living and travelling under the waves, that they might observe the marvellous changes, forms of life, both animal and vegetable, in their native home. This can now be done, for a visit to an aquarium is a visit to the realms of Father Neptune.

* Read before the Members of the Huddersfield Naturalists' Society.

And as Naturalists we can but look at the establishment of Aquaria throughout this country as one of the great events of this age. Natural History cannot succeed as it ought to succeed, without multiplied observers, and to multiply observers it must be popularised. This is what I believe Aquaria will tend to do; and one cannot but hope that when our mechanics and artizans visit the sea shore, they may with observing eyes note the lovely forms of life that there abound, and thus gain knowledge and a love for nature, which will do more to invigorate the system and strengthen the body than sitting about on the public piers, smoking cheap cigars and drinking beer.

Aquaria are in a limited sense things of antiquity, for I doubt not school boys long ago used to do what they do now, keep in bottles, or jars, or any other receptacle procurable, tadpoles, newts, eels, minnows, gudgeon, &c., until having tired of their pets, they forgot them for a few days, and they perished.

But Aquaria as we now think of them assume nobler proportions—that of Brighton has 740 feet of linear frontage—Manchester (the one I visited) 680. The word “Aquarium” was introduced by P. H. Gosse, 1853, and has been retained ever since; although he limited it to a place where such animals and plants were kept which could not live out of the water for any length of time. Now porpoises and seals are justly considered as having a place among the inhabitants of an aquarium.

The great difficulty in an aquarium is how to keep the salt water thoroughly *clear* and *fresh*, especially when we think of the distance of Manchester from the sea, and the expense in carrying barrels of sea water backwards and forwards.

There are two systems, both of which have their advocates; they are represented by Brighton and Manchester, Brighton being on the “Aëration” system, and Manchester on the “Circulation” system. In the Aëration system the water is practically stagnant in the tanks, but air is forced by means of steam power into the bottom of the tanks, and from thence it rises in large bubbles to the top. The water in this aquarium used to be supplied from the sea, but it was found that this often rendered the tanks turbid and muddy, and has now been given up. The objections to this system are :

1. The water is never very clear.
2. The number of fish in each tank must be limited.
3. The water in a well-stocked tank must be occasionally changed.

In Manchester the circulation principle is in use. There are 300,000 gallons of sea water in the tanks and reservoirs—about

50,000 in reserve, the rest in use. The water is always changing position; it is pumped from the spare tank into those which contain fish, and from which it returns to its original receptacle, "so that a constant and perfect circulation is maintained. This process itself constantly exposes fresh surfaces of water to be oxygenated by the surrounding atmosphere, although its still more perfect oxygenisation is secured by the force of the streams delivered into the stock tank." The water, which was all procured from Blackpool, will need no renewing beyond that necessary on account of leakage or evaporation. Those tanks whose inhabitants need an artificial tide, are also supplied by means of taps with high and low water. Another feature in the Manchester Aquarium is the fresh water department, which is supplied on the same principle and is a great success.

(To be continued.)

Rainfall for July.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL. TO DATE.		Date of heaviest Fall.	Amount of heaviest fall.
				1877.	1876.		
Huddersfield (Dalton)..... (J. W. Robson.)	350	2·73	14	21·61	*16 99	14th	0·70
Wakefield..... (F. Hill.)...	120	2·93	19	18·99	...	14th	0·88
Leeds ... (H. Crowther.) ...	183	3·55	16	18·48	...	15th	0·89
Barnsley .....(T. Lister.) ...	350						.
Ingbirchworth ... (Do.).....	853	No Returns.					
Wentworth Castle (Do.).....	600						
Goole... (H. F. Parsons.) ...	25	1·97	15	13·42	12·01	14th	0.65

* This is the average to July for 11 years, 1866-76.

Short Notes and Queries.

Mecyna polygonalis AT DEAL.—Mr. W. H. Tugwell, of Greenwich, writes me that he has taken a beautiful specimen of this species at Deal. This I believe is only the second recorded occurrence in Britain, the last having been taken at Bury St. Edmunds in 1868.—GEO. T. PORRITT, Huddersfield, August, 1877.

STONE CURLEW v. NORFOLK PLOVER.—I thought naturalists liked to use the oldest names for birds. Is not "stone curlew" older than "Norfolk plover?" I see in a book I have (*more than 200 years old*, called "Pinax," which gives a list of British birds) stone curlew is mentioned, only it is spelled *curlieu* (p. 182). It is said to come "Ex agro Hantoniensi," which, I suppose, means out of "Hampshire." In "Selborne" it is called the same, and that is in the same county. In Wiltshire and Dorsetshire the people always call it curlew (without the "stone") from its note, which is just like that word, more so than the whistle of the *sea* curlew. So I think "stone curlew" the most proper name, for it is as much of a curlew as can be.—FRED N. LOWNE, Downton, Salisbury, August 8th.

PEACE AND WAR.—At Felbrigge Park, near Cromer, a hedge sparrow nested in one of the Waterloo cannons which stand on the lawn. I have heard of a pair of tits hatching a brood in a bombshell (*Field*, June 20th, 1874), and I remember reading of a robin which nested in a shot-hole in the mast of the "Victory"—Nelson's flag-ship, on board of which he was killed at the battle of Trafalgar.—J. H. GURNEY, Jun., Northrepps Cottage, Norwich, August 4th.

Carabus nitens AT RICHMOND.—Coleopterists interested in geographical distribution must feel thankful to Mr. Harris for publishing the occurrence of the above, but, as the editors remark, it is not at all uncommon in the county. Curtis, Dawson, and Stephens each make special mention of Yorkshire as a locality where it occurs abundantly. In my own collection I have one from Bingley moor, collected by Mr. W. D. Roebuck, who thinks that it might not unfrequently be found in the same locality.—HY. CROWTHER, Leeds.

Clivina fossor, LINN.—For two or three years the only specimens I had of this interesting beetle were gathered by myself in Cheshire. This year, however, from specimens that have come into my hands, I have been somewhat struck with its occurrence around Leeds; of these, one is from Agbrigg, near Wakefield, and two from Pannal, taken by Mr. W. D. Roebuck; a fourth was gathered a little beyond Ilkley, by Mr. C. Smethurst, whilst a fifth was collected by myself in Newlay Wood, near Leeds. It frequents decaying rubbish on the banks of rivers and canals, or seeks the shelter of stones in woods, &c. Stephens says it may be found anywhere or at any time, which must, like many of his statements, be received with due caution, as the whole of the specimens I have seen, which are dated, were taken both in Cheshire and Yorkshire, either in May, June, or July. For the guidance of those who may have taken it and yet not recognise it under its name, and thinking too that an enumeration of specific differences of well-known forms is out of place, I may add that there is a capital illustration in Rye's "British Beetles" of *C. collaris*, a species differing principally in colour, the elytra being much lighter;

fossor being pitch-black, with ferruginous legs, antennæ, and palpi, in length about three lines. *C. collaris* is thought by some coleopterists to be merely a variety. Being interested in its Yorkshire distribution, I should be glad to receive any notes in furtherance of this object by anyone who has collected it in the county.—HY. CROWTHER, Leeds.

Goodyera repens IN CUMBERLAND.—On the 30th of July last, I found *Goodyera repens* growing in plenty in a large fir wood near Armathwaite, on the Eden. This Scotch plant seems to be gradually extending its distribution to the northern counties where a suitable habitat is to be found.—GEO. BROOK, ter, Huddersfield, August 9th.

Reports of Societies.

BRADFORD NATURALISTS' SOCIETY.—Meeting July 24th, the president in the chair.—The following plants were exhibited by Mr. Carter:—*Apium graveolens*, *Comarum palustre*, *Habenaria viridis*, *Listera ovata*, *Genista tinctoria*; *Campanula latifolia*, *Ophioglossum vulgatum*, &c. Mr. Firth exhibited the following insects:—*Mania typica*, *Triphæna fimbria*, *Metrocampa margaritata*, *Cidaria populata*, *Sesia tipuliformis*; the larvæ of *Vanessa cardui*, *Atalanta*, *Io*, and *urticæ* were also exhibited.

MEETING August 1st, the president in the chair.—Mr. William Jagger gave an interesting account of a four days' entomological ramble in Huntingdonshire, and Mr. Illingworth a descriptive account of the Goole ramble. The following insects, taken at Saltaire, were exhibited by Messrs. Carter and Firth:—*Geometra papilionaria*, *Uropteryx sambucata*, *Melanthis rubiginata*, *M. ocellata*, *Eupithecia subnotata*, *E. nanata*, *Larentia olivata*, *Acidalia incanaria*, *Asthena luteata*, *Bryophila perla*, *Notodonta camelina*, *Agrotis porphyrea*.—H. T. S.

BRIGHTON AND SUSSEX NATURAL HISTORY SOCIETY.—Meeting June 15th, the president in the chair.—Mr. H. Goss, F.L.S., supplemented his previous paper by another equally exhaustive one, on “The Insect Fauna of the Secondary Period.” He treated the subject in the same masterly manner as in his paper on the “Tertiary Period.” In the upper oolite, the coleoptera prevail to the largest extent; 45 species in Britain, whereas, in its Continental equivalent, the hymenoptera are the most largely represented, whilst in the Continental lias the coleoptera are represented by 116 species out of 143 tabulated.—We hope to publish one or both of these useful papers shortly.—EDS. NAT.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting August 10th, in the Museum, South Street, Mr. C. P. Hobkirk, president, in the chair.—The chairman exhibited a few botanical specimens, sent to him from the New Forest the previous week, by Mr. Porritt, amongst them were *Ana-*

gallis tenella, *Hypericum elodes*, *Scutellaria minor*, *Wahlenbergia hederacea*, &c. Mr. S. L. Mosley showed pupa cases of *Colias Edusa*, sent to him by Mr. E. A. Fitch, also the following imagos :—*Vanessa C. album* (bred), *Tortrix icterana*, *Coremia ferrugata* (bred), and others ; also a box of diptera, all (with the exception of two or three species from Sherwood Forest) taken in the district : *Leptis scolopacea*, *Dolichopus œneus*, *Dryomyza flaveola*, *Acydromia glabicula*, *Eristalis tenax*, *Helophilus frorens*, *Conops flavipes*, *Syritta pipiens*, *Platychium clypeatus*, *Melanosterna mellina*, *Syrphus ballealus*, *Trixa astroidea*, *Sarcophaga carnaria*, *Musca corvina*, *Hæmatapota pluvialis*, *Chrysomyia formosa*, *Sargus cuprarius*, *Empislurida*, *Anthomyia cunicularis*, *Syrphus Ribesii*. Mr. G. T. Porritt exhibited a fine specimen of *Caradrina morphœus* he had taken several weeks previously at sugar in his garden at Highroyd ; the species was quite new to the district. He had since seen several others taken in the same neighbourhood. The president added to the library a copy of his and Mr. Boswell's " Catalogue of British Mosses."

LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—256th meeting, July 24th, president, Mr. James Abbott, in the chair.—Mr. Henry Pocklington, F.R.M.S., delivered the second part of his lecture on " Flame," illustrated by diagrams and experiments.

257TH MEETING, July 31st, the president in the chair.—The chairman exhibited a beautifully mounted slide of *Volvox globator*, showing the cilia. Mr. J. W. Westmoreland, A.R.S.M., a small piece of dynamite, and gave an account of the substance. Mr. S. Schofield, a specimen of *Ophioglossum vulgatum*, from near Stanningley. Mr. H. Crowther, *Smerinthus populi*, from Thwaite Gate, Hunslet. The secretary, a number of insects collected in Wales. Mr. John Grassham, various larvæ, specimens of *Helix aspersa* from Ingleton, and specimens of Colorado beetles from Canada. He also showed specimens of insects which have been mistaken for that beetle, and an interesting discussion on the subject took place.

258TH MEETING, August 7th, the president in the chair.—A specimen of *Sirex gigas*, from Thorpe Arch, was exhibited on behalf of Mr. John Emmet. A batch of larvæ of *Orgyia antiqua*, from Horsforth, on behalf of Mr. James Fox, C.E. On behalf of Mr. Edwin Yewdall, a number of small and lively cockroaches (? *Blatta Germanica*), from a greengrocer's shop in Wade Lane, Leeds, where they are abundant. They also occur in other parts of Leeds. They are less than half the size of the common "black-clock," and are probably of recent importation. Mr. Charles Rider, a living female glow-worm, from North Rigton. Mr. Henry Pollard, *Helix nemoralis*, *H. hortensis*, and *H. hybrida*, from Whitley. The secretary showed some insects and shells collected at the Union meeting at Goole the preceding day. Lepidoptera from Goole Moor were also exhibited by Mr. Charles Smethurst and Mr. Henry Marsh. Mr.

Marsh also exhibited some from Leeds and Bishops Wood, and Mr. Smethurst some hymenoptera parasitic on a beetle-larva. Mr. John Grassham, larvæ of *Vanessa atalanta*, and all the stages of existence of *Orgyia antiqua*. A number of plants collected at Goole were shown by the president and Messrs. S. Schofield and C. Smethurst. The president called attention to a plant of *Drosera rotundifolia*, in which one leaf was green from the absence of the usual red colouring matter. Mr. James R. Murdoch showed plants from Adel and the Isle of Man. Mr. John W. Taylor, *Helix souverbiana* and *H. farafanga*, from Madagascar, and *H. Falconeri* from Australia ; remarking that Madagascar possesses numerous fine types of *Helix*, while the adjoining region of East Africa has not one representative of that genus, thus tending to show the zoological distinctness of the two regions.

259TH MEETING, August 14th, the president in the chair.—Mr. Charles Rider read an excellent paper on “The Classification of the Protozoa,” in which he gave the substance of the latest researches in this group. The paper, which was illustrated by diagrams, was much appreciated by the members, and very vigorously discussed.—WM. DENISON ROEBUCK, Secretary.

NORTH STAFFORDSHIRE NATURALISTS' FIELD CLUB AND ARCHAEOLOGICAL SOCIETY.—We have received the annual report and transactions of this Club. As is generally well known, it is in a most flourishing condition, and has always held its own with any similar one in the kingdom ; the report just issued certainly shows that it still maintains its position, as it is, if possible, even more interesting than usual. The summer excursions were evidently well chosen, as at all of them capital work was done, either in the natural history or archaeological departments, generally in both. The winter evening meetings were also quite as successful, the papers read (notably one on “The Wild Flowers of North Staffordshire,” by the Rev. D. Edwardes, M.A., on February 22nd) being of more than ordinary interest and character. We are pleased to find, too, that the sectional system of working has been in full operation, and in the geological, archaeological, and entomological departments with success ; but in the other branches the plan has been somewhat of a failure. It is odd, indeed, that botany, so universally a favourite science, should have so few adherents in North Staffordshire. We should like to give many extracts from this report, but want of space forbids, but probably we have said sufficient to indicate the high state of efficiency and good management of the Club. At present it consists of 307 members, and has a balance in hand of £24 8s. 10d.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting, 30th June, Mr. R. Earnshaw, vice-president, in the chair.—A number of botanical specimens were collected and named by Mr. C. Sheard, including *Lysimachia nemorum*, *Stellaria holostea*, *Pedicularis palustris*, *Carum carui*, &c.

Mr. T. Cockcroft laid on the table some fine geological specimens, which were named by Mr. James Spencer, amongst them being *Goniatites Listeri*, *Aviculo-pecten*, *Orhoceras*, *Atenuatus cinctum*, fish bones, teeth, and scales, *Lepidodendron Harcourtii*, *Lepidostrobus*, and from Ringby, *Calamites cannaeformis*, *Halonia regularis*, *Knorria taxinus*, and *cardiocarpous*. Mr. T. Hirst exhibited a number of birds and animals both in cases and in the skin ; one pair of pile pheasants, one pair of ptarmigans. The following were from America :—One pair of snowy owls, one pair of kestrel hawks, one pair of grey squirrels, and one fox, a splendid skin.

MEETING August 4th, Mr. T. Scott, president, in the chair.—A number of botanical specimens were collected by Mr. R. Earnshaw, and named by Mr. C. Sheard, viz :—*Lamium album*, *Doronicum Pardalianches*, *Plantago media*, *Geranium sylvaticum*, *Thalictrum flavum*, &c. Mr. T. Hirst exhibited the lesser tern, barn owl, laughing gull, one pair of land rails, and the long-tailed wagtail. Mr. J. Ogden exhibited a large number of specimens in entomology, and a large variety of stag beetles. In geology, Messrs. Spencer and Cockcroft exhibited a collection of fossils which they had obtained during a ramble over the Queensbury tunnel in the afternoon, including the following :—Four species of *Goniatites*, viz., *Listeri*, *calyx*, *Looneyi*, and *paradoxicus*; three species of *Orthoceras*—*laterale*, *attenuatus*, and *Steinhauri*. *Aviculo-pecten papyraceus* occurs in abundance in the shales brought out of the tunnel ; *Lingula squamiformis* and *Posidonomya* also occur in the same pecten shale. A small species of *Posidonomya* was also shown, which is new to this locality. It was found very plentiful in an ironstone layer. Over this layer, the shale contains ironstone nodules, one of which yielded a *Modiola*, or fresh-water mussel.

—J. OGDEN, Hon. Sec.

SELBY NATURALISTS' SOCIETY.—32nd meeting, ramble to Escrick Woods, August 8th.—175 plants were observed in flower, including *Lysimachia nemorum*, *L. nummularia*, *L. vulgaris*, *Circœa lutetiana*, *Anagallis tenella*, *Polygonum fagopyrum*, *Gentiana pneumonanthe*, *Colchicum autumnale*, *Campanula latifolia*, and *C. glomerata*. The weather being showery, the entomologists did not secure any rare specimens. Permission was granted by Lord Wenlock to view the grounds and gardens, with which the party were much interested, particularly in the extensive collection of conifers and forest trees. At Escrick Station a fine section of the boulder clay bed was inspected, and several slabs of limestone, bearing unmistakable signs of ice scratching, were found.—W. N. CHEESMAN.

WAKEFIELD NATURALISTS' SOCIETY.—Mr. W. Talbot in the chair.—Mr. Sims exhibited *P. comitata*, *L. cæsiata*, *H. velleda*, *A. menyanthidis*, *N. cucullatella*, &c. Mr. E. E. Talbot, a young cuckoo, caught August 1st, not fully fledged ; considered very late. The chairman shewed larvæ, pupæ, imagos, and eggs of *Bombyx cynthia*. Mr. Mason, the common field vole.—JOHN SPURLING, Hon. Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting, Mr. M. Smith in the chair.—Mr. Prest, the hon. secretary, reported that he had attended the meeting of the Yorkshire Naturalists' Union at Goole, and was glad to state that it was one of the best meetings held this year. One or two specimens of moths, new to the district, had been found, and the day's collecting had been very good. Mr. R. Cooke exhibited *Scotosia vetulata*, *G. viscarieilla*, *C. palliatella*, and *genistæ*. Mr. Dutton, *Tethea subtusa*, *Scotosia undulata*, *P. bajularia*, *Acidalia imitaria*, and *Rhodophæa tumidella*. The chairman, a specimen of the Colorado beetle, *Doryphora decemlineata*, *Dermestes marinus*, and *Superpa populana*. Mr. C. Helstrip, specimens of the Colorado beetle, and eggs of the Griffon vulture, *Vultur fulvus*, *Falco rufipes*, *Ibis falcinellus*, and *Sylvia luscinia*. The secretary (Mr. Prest), *Phycis betulella*, *carbonariella*, and *roborella*, *Pempelia palumbella*, *Tortrix cinnamomeana*, *Amphysa gernigana*, *Phoxopteryx uncana*, and a fine series of *Coleophora palliatella*, and cases, bred from larvæ taken at Cawood during the Society's excursion there.—W. PREST, Hon. Sec.

YORKSHIRE NATURALISTS' UNION.—The fifth meeting for 1877 was held at Goole, on Bank Holiday Monday, the 6th of August. The principal object of interest was the wide extent of moorland known as Goole Moor or Thorne Waste, and in one part as the famous "Level of Hatfield Chase." As will be seen from the Sectional Reports, the excursion as a whole was most successful, resulting in much good and useful work. Several parties were organised. The geologists, led by Mr. Lockington, of Goole, spent the day on the Ouse banks, where, besides studying the recent geology, they found numerous liassic fossils from Frodingham, among the stones used for protecting the river bank. The conchologists, in charge of the Rev. R. D. Maxwell, confined their researches to the warp lands between Goole and the Swinefleet Warping Drain. A party of botanists visited the Rabbit Hills at Rawcliffe. The ornithologists were led by Mr. Thomas Bunker, of Goole, who took them on to the moors. The main body of botanists and entomologists, led by Dr. Parsons, went on the moors by way of Moorfield Farm. The two last parties met on the moors, two or three parties coming from the southward, some from Thorne, and others from Medge Hall Station. Tea having been provided in the Board Schools, Goole, at 4 o'clock, and the Sections having made the preliminary examinations of the materials accumulated, the general meeting began at 6 o'clock, the Rev. Wm. Fowler, M.A., president, in the chair. About 50 were present at the meeting, and over 80 throughout the day. Sixteen Societies were represented, the absent ones being Clayton West, Stainland, Ripponden, Holmfirth, Rastrick, Honley, Middlestown, and the Leeds Geological Association. After a vote of thanks for additional donations and subscriptions to the funds, the Sectional Reports were given.—Mr. William Talbot, president, and Mr. Thomas Lister, secretary, of the Vertebrate Section, stated the resident birds observed included the missel thrush, song thrush, blackbird,

hedge accentor, redbreast, stonechat, greater tit, blue tit, pied wagtail, meadow pipit, skylark, bunting, blackheaded bunting, yellow bunting, chaffinch, tree sparrow, house sparrow, greenfinch, linnet, starling, rook, jackdaw, wren, ring dove, stock dove, partridge, golden plover, peewit, heron, redshank, common snipe, moor hen, wild ducks (plentiful on the warpings and the pits, but not near enough to then distinguish the species satisfactorily), common tern, blackheaded gull, kittiwake, lesser black-headed gull, herring gull. Summer migrants : whinchat, wheatear, sedge warbler, reed warbler, willow warbler, Ray's wagtail, swallow, martin, sand martin, swift. Mammalia, &c. : water vole, common rat, weasel, mole, hare, rabbit. Reptilia : the adder or viper.—Mr. James Spencer, chairman of the Geological Section, and Dr. Parsons, reported : the strata of the neighbourhood were, 1 warp, 2 peat, 3 sand, 4 laminated clay, 5 gravel, 6 (probably) boulder clay, 7 new red sandstone (Keuper and Bunter). Only the four upper are exposed near Goole, but the gravel may be seen at Thorne and Hensall. The peat extends over an area much larger than the moorlands, and varies from 6in. to 20ft. in thickness, and at its base are the remains of an ancient forest. The laminated clay and gravel were no doubt the debris of the boulder clay. The nature of the stones in the gravel showed that it had been carried hither from the west, not from the north, of Yorkshire.—Mr. Nelson, president of the Concho-logical Section, reported that the takes during the day had been but moderate,—17 species and 3 varieties of recent and several fossil mollusks. Those deserving special mention were *Limnæa stagnalis*, var. *fragilis*, of which one specimen was taken on the moor by Mr. S. D. Bairstow, and a single specimen of *Helix arbustorum*, var. *alpestris*, from the warp lands near Goole.—Mr. Wm. Prest, of York, president of the Entomological Section, reported a good day, many very good species having been taken—one, if not two, new to Yorkshire.* *Crambus Warringtonellus* had been taken quite commonly, and he knew of no capture of that species in Yorkshire before ; it is also doubtful whether *Carsia imbutata* has occurred in Yorkshire before or not. The following is a list of species taken during the day :—*Chortobius Davis*, larva of *Bombyx rubi*, *Saturnia Carpini*, *Hadena pisi*, *Anarta myrtilli*, *Bombyx callunae* and *potatoria*, *Hyria auroraria*, *Acidalia aversata* (a very fine variety), *Eupithecia minutata* and *nanata*, *Carsia imbutata*, *Stenopteryx hybridalis*, *Crambus Warringtonellus*, *margaritellus*, and *pascuellus*, *Phycis carbonariella*, *Tortrix heperana* and *viburnana*, *Grapholitha nigromaculana*, *Eupoecilia augustana*, and many very common species.—Coleoptera (part being taken in June) :—There seems to be on the whole a marked distinction between those gathered on the warp land and those from the moor land ; from the former are *Haliplus affinis*, *Phædon vetulæ*, *Coccinella septem-punctata*, and *Phyllobius argentatus* ; from the latter, *Gastrophysa*

* We believe both *C. Warringtonellus* and *C. imbutata* are quite new to the County.—Eds. Nat.

raphani, *Adimonia capreæ*, *Apion sanguineum*, *Oxyporus rufus*, *Phyllobius alneti*, and *Cassida viridis*. Also on the 6th August, *Dyticus marginalis*, *Ilybius ater*, *I. uliginosus*, from the ditches in the warp lands between Goole and Swinefleet. Several specimens of *Lina populi* were taken at the Rabbit Hills, Rawcliffe, August 6th.—Dr. Parsons, secretary of the Botanical Section, reported that the plants observed during the day were 264—a number as great as at any former meeting—while a larger proportion than at any previous meeting were rare species. On the river banks at Goole were found *Spergularia media*, *Ononis spinosa*, *Trifolium fragiferum*, *Ranunculus hirsutus*, *Glaux maritima*, *Plantago maritima* and *coronopus*, *Aster Tripolium*, *Apium graveolens*, *Juncus Gerardi*, *Scirpus maritimus*, *Carex divisa* (new to Yorkshire), and *Sclerochloa distans* and *maritima*. In the ditches and fields between Goole and the moors were found *Thalictrum flavum*, *Lamium incisum*, *Typha angustifolia*, *Ranunculus circinatus*, all four species of *Nasturtium*, *Oenanthe Lachenalii*, *O. Phellandrum*, *O. fistulosa*, *Sium latifolium*, *Samolus Valerandi*, *Lysimachia vulgaris* and *nummularia*, *Hottonia palustris*, *Veronica Buxbaumii*, *Helminthia echiooides*, *Butomus umbellatus*, and *Scirpus tabernæmontana*. On the moors the three British species of *Drosera*, *Comarum palustre*, *Rhamnus frangula*, *Vicia tetrasperma*, *Andromeda polifolia*, (plentiful), *Vaccinium Oxycoccus*, *Epilobium angustifolium*, *Rhynchospora alba*, *Carex stricta*, *Narthecium ossifragum*, *Empetrum nigrum* and *Osmunda regalis*; and at Rawcliffe, *Campanula latifolia*, *Gentiana pneumonanthe*, *Hypericum elodes*, *Radiola millegrana* and *Pilularia globulifera*. A discussion arose about *Empetrum nigrum*, Dr. Parsons suggesting that it might have been carried to Thorne Waste by wild birds, from the high western moors, as its berries were a favourite food of many moorland birds, and it was only found around the ponds on the Waste frequented by them. Dr. Lees thought it more probable that it was an original inhabitant of the district, and pointed out that there were other examples in the local flora of the Goole district of the mingling of mountain and lowland plants. About 12 mosses were found including *Sphagnum fimbriatum* (fr.), *Physcomitrium pyriforme* (fr.), and *Polytrichum formosum*, also 3 Hepaticæ, 5 Lichens, and 4 Fungi.—Mr. Lister was appointed delegate from the Union to the British Association, on the motion of Mr. E. Hunter, president of the Goole Scientific Society, seconded by Major Best, of Goole. Votes of thanks were afterwards accorded to the Goole School Board for the use of the Schools; to Dr. Parsons, the local secretary to the Goole Scientific Society, for their admirable arrangements; to Mr. Makin Durham, Mr. Empson, the Hon. A. F. Hood, Mr. Duckels, Capt. Harris, and Major Best, for permission to cross their lands; and to the Chairman.—W. D. R.

CORRECTION.—The specimen of *C. Edusa* taken by Mr. Firth at Saltaire, June, was 1877, not 1876, as reported.—H. T. S.

Diary.—Meetings of Societies.

- Sept. 3. Barnsley Naturalists'.
,, 4. Bishop Auckland Naturalists' Club. Liversedge Naturalists'.
Leeds Naturalists' Club, &c.—Conversazione, admission by
Ticket.
,, 5. Entomological Society of London, 7 p.m.
,, 6. Leeds Conchological Club.
,, 8. Yorkshire Naturalists' Union—Excursion to North Dean, for
Norland and Greetland Moors. Tea and Meeting at 4 p.m.,
in the Copley School Room near the Station. Leader: Mr.
C. C. Hanson.
10. Huddersfield Naturalists', 8 p.m.—Paper by Mr. Joseph French.
,, 11. Leeds Naturalists' Club, &c.
,, 12. York and District Naturalists'.
,, 14. Huddersfield Scientific Club, 8 p.m.
,, 15. Goole Scientific Society—Excursion to Camblesforth. Heckmond-
wike Naturalists'.
,, 20. Leeds Conchological Club. North Staffordshire Naturalists' Field
Club—Excursion to Alderley Edge. Leader: Rev. T. W.
Daltry, M.A., F.L.S.
,, 22. Batley Naturalists', 8 p.m. Huddersfield Naturalists'.—Paper:
"British Polystichums, and their Varieties," by Mr. Joseph
Mackenzie.
,, 25. Leeds Naturalists' Club, &c. Paper on "Ozone," by Thomas
Fairley, F.R.S.E., F.C.S.

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ERRATA IN LAST NUMBER.

- Page 19, line 4, for "Incognitis" read "Incogniti."
" 18, for "Grassiveria" read "Grassinervia."
" 28, for "small fence" read "sunk fence."
Page 20, " 8, for "Hesletine" read "Hesleden."
" 21, for "Daller" read "Dallom."
" 21, delete "it is nearer Ripley."

We regret having to leave out for want of space the Barnsley Naturalists' Societies Meeting (in our next), and communications from Mr. R. Marchant, &c. We should also be obliged if our Correspondents would kindly write scientific names and names of places as *plainly* as possible.

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Original Articles.

A Q U A R I A.

REV. G. C. B. MADDEN, B.A.

[*Concluded.*]

A GREAT object, both for the preservation of colour as well as for the comfort of the inhabitants, was to furnish the tanks with rocks and sea-weed. The formation of a natural rock with background which would enable the fish to be clearly seen was a great difficulty. Small pieces of rock were bedded in a groundwork of cement and piled up, but the leakage was great and the effect bad. At present all is beautiful ; the background of each tank is apparently formed of huge storm-beaten boulders, that strike one with wonder ; yet these seemingly mighty rocks are made up of chippings of stone, jointed together with cement. Nobody would suspect this, and I doubt if the old lobster, who sits in his comfortable hole, has any idea but that he is still under the shade of the old granite walls where he was born.

Next perhaps in interest we notice the massive plate glass fronts to the tanks—the largest are 1 inch thick, 5 feet high, 3 feet broad, yet at first breakages were very numerous, until a better system of framing the ponderous fronts was found out.

Illumination formed a perplexing point, and is not yet quite as good as it ought to be. Too much light causes a rapid growth of confervæ upon the rockwork and glass, which needs clearing away. The light in too many cases falls upon the front glass, and thus they are formed into veritable mirrors, revealing the outside beauty, but concealing the inside ; the light wants to fall through the top of the water on to the background of the tank, and then I doubt not every corner would be visible, and the inhabitants become distinct in every motion, and not as they now are, shadowy mists. A greatly to be desired object has not yet been attained, viz : the growth in any quantity of sea weeds, a few of the green and red sea-weeds have been put in, but there is as yet no healthy growth, and the larger fuci and *Laminariæ* have so far quite baffled the attempts of curators. It is to be hoped that in course of time this may be obviated, and that the marine vegetable world may be displayed to the eager eyes of the observant public. No more lovely picture could be imagined than that of a large tank, whose rock-work, back, and sides were more or less clothed with waving forests of living sea-weed, among whose recesses multitudinous shoals of finny inhabitants disport themselves.

It would be impossible to speak, in the course of a short paper, of the inhabitants of the various tanks. Perhaps the *Octopus* in point of interest, though certainly not in point of beauty, deserves notice. It is simply a great bag, furnished with two mouths, eight legs, no cuttle bone. Through one of the mouths it draws in water, which washes the internal gills, and is ejected in a rushing stream through the other. By means of this stream it is enabled to rush through the water very quickly. In tropical seas they assume gigantic proportions, and have arms six, or even eight feet long.

Time would fail to speak of the sturgeon, wray, whitebait, turtle, lobster, crab, and other inhabitants to be seen. I shall conclude my brief paper with a quotation.

"A conservatory, with its store of mute, perishable blooms, is a luxury in which the refined and intellectual mind cannot cease to revel and delight; but if for these, at a similar or even less cost, we can exchange a variety as infinite in form and colour, endowed with animal vitality, and an instinct enabling them to respond to our care and attention, and thus to appeal to the highest feelings of our nature, so much the greater pleasure to be gained. To add to this, there is thrown over all such a halo of absolute novelty, with such an inexhaustible and ever-changing wealth of variety to choose from—from the lowly anemones up to the resplendent and highly intelligent fishes—that those once venturing into the 'fresh fields and pastures new' now thrown open to them through the perfection already arrived at in aquarium mechanics, will only have cause to regret that the gateway has been so long blocked up." Lastly, but not leastly, every one so venturing acquires the position of an original observer, and by a careful and intelligent record and interpretation of the phenomena in constant progress beneath his eyes, more especially in association with the artificial cultivation of animal forms of economic value, has opportunities of benefitting both science and the community at large, that have been hitherto unattainable.

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NOTES ON SWISS MOLLUSCA, &c.

BY JNO. W. TAYLOR.

IN August and September last year I spent a short time in Switzerland, and though unable to give much time to searching for shells, the results of my observations may be of interest.

The species observed, were mostly such as are also found in the British Isles, but curiously enough our rarer and more local kinds as *Clausilia parcula*, *C. biplicata*, *Helix obvoluta*, &c., are amongst the most abundant species, whilst some of our commonest shells as *Helix aspersa*, *H. virgata*, &c., I did not observe at all during my stay.

Two species are also found in Switzerland (*Helix incarnata* and *H. fruticum*) which formerly existed in England, as attested by their fossil remains in our upper tertiary formations.

I entered Switzerland from France at Basle, which has a quaint and novel appearance, caused by the overhanging eaves and variously coloured and fancifully arranged tilings of the roofs of the houses. On my way to see the beautiful monument to the Swiss patriots killed at the battle of St. Jacob, I observed great numbers of *Helix pomatia* crawling about, a passing shower having greatly influenced their appearance. *Helix nemoralis* also occurred in the same locality.

At Neuhausen is situate the Falls of the Rhine, locally known as the "Laufen," the largest and most imposing falls in Europe; the river being here nearly 400 feet wide with a total descent of 100 feet. The water is beautifully clear, and from the railway bridge above the falls, which may be crossed on foot, the rocks forming the bed of the river are distinctly visible. On a sloping grassy bank bordering a Vineyard on the north side of the river *Bulimus detritus* was very common, and *Helix pomatia* occurred near the same place. On the south side of the river on the walls and vegetation *Clausilia biplicata*, *Pupa secale*, and *Helix obvoluta* were very common: *Zonites glaber*, *Clausilia laminata*, and *Helix lapicida* also occurred here. The *Zonites glaber* is interesting as being a species long confounded with *Zonites alliarius*, by British Conchologists, but its specific characters are not so definite in British as in continental specimens.

Helix lapicida which occurred very plentifully on the face of the rocks moist with the spray from the falls, is of a form which attains its extreme development in the Philippine Islands in *Helix planulata*, &c.

On the foliage of the bushes which clothe the sides of the cliffs bordering the river, *Helix sylvatica*, *Helix hortensis*, *Helix lapicida* and *Helix fruticum*, were excessively abundant. I got here a very nice specimen of the variety *rufula* of *H. fruticum*.

Helix sylvatica so plentiful here, I only met with in one other place. Deshayes, the great French conchologist, at one time proposed uniting this species with *Helix nemoralis*; though undoubtedly closely allied, there does not seem to be any good ground for merging them into one species.

In the journey to Zurich many charming views of the beautiful river present themselves, and we get a last glimpse of the falls. By the side of the Hohe promenade, in an avenue of lime trees situate a considerable height above the lake, of which it commands an extensive and charming view, I observed *Helix pomatia*, the only mollusk I saw at this place.

Fluellen, at the foot of Lake Uri, is situate amidst the most sublime mountain scenery, the massive mountains towering almost vertically from the margin of the lake, and snow-capped summits often wreathed with clouds are visible in the distance. In this vicinity occurred many of the most stirring events of Swiss history.

At Tell's Platte, on a ledge of rock at the base of the Axenfluh, embowered in trees, stands Tell's chapel, on the walls of which are depicted scenes from the life of the great patriot. It is said to have been erected on the very spot where he sprang from Gessler's boat. At Altorf, near Fluellen, is said to have occurred Tell's great exploit of shooting the apple from his son's head. An immense statue of Tell, in plaster, and a fountain commemorate the event.

Between Fluellen and Altorf the abundance of *Helix rupestris* and *Pupa secale* was something astonishing, filling almost every convenient place in the wall bordering the road. Under stones and amongst the herbage of the hedge bank were *Helix pomatia*, *H. nemoralis*, *H. rotundata*, and *Clausilia biplicata*.

Helix rotundata, which in England is one of our very commonest shells, only occurred to me sparingly at this place. This is an extremely pretty species, and would be prized for its beauty if it were a greater rarity.

The Axenstrasse, or road skirting the lake and leading from Fluellen to Gersau, abounds with scenery of imposing grandeur, the mountains rise directly from the sides of the path, and in many cases overhang, or actually, as at Axenberg, have so obstructed the path as to have necessitated tunnelling through a massive buttress of solid rock. On the scanty vegetation by the path side I found several very characteristic specimens of *Helix ericetorum*, var. *minor*, *H. arbustorum*, and the universally distributed *H. pomatia*.

On the slopes of the Righi I saw very few mollusks. At Kaltbad, which is about 5000 feet high, I found *H. arbustorum*, var. *alpestris*, *H. pomatia*, and *H. villosa*. *H. arbustorum* belongs to the sub-genus *Arionta*, which has its largest development on the Pacific coast of the United States, and is represented in Europe by this single species, far removed from the head quarters of the group.

A dwarf thistle, with very large white flowers, was very common on the mountain sides; its flowers were nearly three inches in diameter.

In passing from Alpnacht to Brienz, I found near the summit of the Brunig pass, *H. pomatia*, *H. hortensis*, *Clausilia rugosa*, *Pupa avena*, and *Bulinus montanus*, all attached to the face of the bare rocks. The *B. montanus* were the only examples of the species I obtained; they are much more slender than English shells, and resemble very much some collected by Mrs. Fitzgerald in Bavaria, for specimens of which I am indebted to that lady's kindness. A portion of this pass gives some really magnificent views, the road being far away up the mountain side, while almost beneath your feet lies the verdant valley, hemmed in again by mountains down whose precipices fall numerous streams in charming cascades.

On the banks of the Lake of Brienz are the celebrated falls of Gheissbach, a series of seven cascades descending near 1200 feet to the lake below. The mountain side is clothed with a luxuriant growth of trees and herbage, amongst which, more especially in those parts moist with spray from the falls, were numerous species of mollusks, *H. villosa*, *H. personata*, *H. obvoluta*, *H. hortensis*, *H. arbustorum*, *H. incarnata*, *C. biplicata*, and *Pupa secale* being the most noteworthy. *H. personata* is an extremely interesting shell, belonging to the sub-genus *Triodopsis*, which, with the exception of this species so remote from its allies, is exclusively North American. It resembles very closely the *H. inflecta* of Say, and has little affinity with *H. clausa* of the same author, though evidently from misconception some writers have applied the name *clausa*, Say, to *inflecta*. The true *H. clausa* is quite a different shell, destitute of apertural teeth, and belongs to the sub-genus *Mesodon*.

On the road-side between Interlaken and Lauterbrunnen, *H. hortensis*, *H. villosa*, and *H. pomatia* were common on the vegetation and fences, *pomatia* especially evincing a partiality for those situations. On the sides and beneath the masses of loose rock, *H. arbustorum* was the most common shell. Many butterflies of our English species were flitting about in the sun, *Argynnis Paphia*, *Erebia blandina*, and *Lycæna Alexis* being the most common. Insect life seemed abundant in this valley, for in addition to numerous butterflies, grasshoppers of various species swarmed, their continued stridulations compelling notice. The almost total absence of small birds was another remarkable feature of the country. The valley at Lauterbrunnen is very narrow, and so enclosed by lofty and precipitous mountains that the sun's rays do not penetrate in winter before midday. A great number

of streams fall from the rocky heights, the most remarkable of which is the Staubbach. This is an exquisitely beautiful sight, the stream of water descending in one fall nearly 1000 feet, dissolving itself in a cloud of finest spray, which the gentlest breeze sways about in strange and ever-varying forms.

Between Spiez, which is situated on the banks of the Lake of Thun, and Frutigen, mollusca were very plentiful, *H. fruticum*, *H. hortensis*, *H. pomatia*, and *H. arbustorum* being the most common species. I also found several *H. hortensis*, var. *hybrida*, and two fine dark *H. sylvatica*. *H. fruticum*, *H. villosa*, &c., may be considered as typical European species, in contradistinction to *H. personata* and *H. arbustorum*, which are solitary representatives of genera not otherwise found in the Old World.

Nearer Kandersteg the scenery becomes wilder and more magnificent, and on the loose masses of rock by the roadside I find *Pupa avena* and *H. rupestris* in great numbers. Amongst the herbage many species were to be found, the most conspicuous species being *H. arbustorum*, *H. fruticum*, *H. villosa*, &c. In the fitful glimmers of sunshine numbers of some of our English species of butterflies disported themselves; I noticed *Colias hyale*, *Satyrus semele*, *Satyrus megæra*, *Erebia blandina*, and I found a pupa of a *Papilio*, probably *podalirius* attached to a blade of grass.

The Gemmi Pass at the foot of which Kandersteg stands is in many respects one of the most magnificent and wonderful in Switzerland, the path winds up the mountain side, passing through a gloomy pine forest, and often seeming as though blocked by the rugged mountain sides; the scenery along this pass is very wild, one part particularly the scene of a landslip is in reality a valley of desolation. Near the summit of the pass the path skirts the shores of the Daubensee a lake about a mile long, fed by the Lämmeren glacier, and usually frozen seven months in the year. On the sloping ground near here and in close proximity to snow, I got some very good *H. arbustorum*, var. *alpestris*: this variety or species as it was formerly considered, is specially characteristic of elevated situations, but the same dwarfed, elongate form has been found in situations quite dissimilar, the neighbourhood of Goole where it was found by Mr. Nelson, at the last excursion of the Yorkshire Naturalists' Union, being a case in point. Very characteristic specimens were lately found by Mr. W. D. Roebuck, at Ingleton in Craven, some of which he kindly added to my collection.

The ascent of the Gemmi Pass from Kandersteg is of a totally

different character to the descent to Leukerbad, which is down the almost vertical mountain side by means of a series of zigzags cut out of the face of the rock, the path below being often overhung by the path far above, the steepest and most dangerous parts being slightly fenced for greater safety.

Between Martigny and Chamounix lies the Tete-Noir pass, the views along which are wildly and gloriously grand. On the grassy slopes numerous butterflies disported themselves in the hot sun; amongst others I caught *Polyommatus virgaureæ*, its vividly gorgeous metallic colouring having a brilliant effect in the sun. The large green grasshopper *Acrida viridissima*, and a very curious species with red under-wings were very common.

At the Hotel Royal, in the Pass, I met a young collector, who showed me specimens of *Parnassius apollo*, *Callimorpha hera*, *Sphinx convolvuli*, &c., which he had taken.

On the slopes of the Brevent at Chamounix, *Parnassius apollo*, *Erebia blandina*, and other butterflies were to be seen, and I also got a very thin *Helix arbustorum*, which would imply that there was a deficiency of calcareous strata at that place.

Colias hya'e, and numerous other butterflies, abounded on the road from Chamounix to Geneva.

On the rail between Berne and Basle I get a farewell glimpse of the snow-capped summits of the Bernese Oberland, and again reach my starting-point (Basle) in the dusk of evening, starting the following morning on my return journey down the Rhine.

St. Ann's-street, Leeds, Sept. 15th, 1877.

Short Notes and Queries.

KINGFISHERS, &c., AT GOOLE.—Kingfishers (rather rare birds at Goole) have been seen several times lately; also a seal in the river.—THOMAS BUNKER, Goole, Sept. 18th, 1877.

THE SECOND BROOD OF *Colias Edusa* IN YORKSHIRE.—The usual autumnal brood of this insect has made its appearance as far north as Yorkshire, in some numbers. One was taken at Arthington Bank on Aug. 31st, and exhibited alive by Mr. Charles Smethurst at the Leeds Conversazione on the following Wednesday; another was seen and nearly captured at Askern on the 1st September, by Mr. Wm. Nelson. Two were recently seen by Mr. Mathew Taylor, at Arthington. About the end of August three were taken at Scarborough by Mr. Henry Marsh,

and one by the same collector at Adel, near Leeds, on the 8th September. The last four were exhibited to the Leeds Naturalists' Club.—WM. DENISON ROEBUCK.

Acronycta alni AND *Colias Edusa* AT WAKEFIELD.—My boy has been out with me to-day, and taken the enclosed larva of *Acronycta alni*, to which you are very welcome. He has also taken a most beautiful specimen of *Colias Edusa*, and we saw five others.—WM. TALBOT, Mount Pleasant, Wakefield, Sept. 9th. [I believe a number of *A. alni* have been taken this year in various localities ; the other day, the Rev. T. W. Daltry, M.A., F.L.S., of Madeley, wrote me he had beaten seven larvæ out of alder at Whitmore, in Staffordshire ! Such a circumstance we suppose is unprecedented. The specimens of *C. Edusa* noticed by Mr. Talbot were of the second brood, and the record of their occurrence is most interesting and valuable, as proving almost without a doubt that the species has bred in Yorkshire. Whether it will stand our winter, or rather the early autumn, and maintain its hold, remains to be seen, but this is very doubtful.—G. T. P.]

Colias Edusa (SECOND BROOD) AT WAKEFIELD.—Mr. Henry Lumb captured six specimens on the 9th instant, and saw several more. I have seen two to-day (Sept. 12th) in the office garden, close by the Prison.—WM. TALBOT.

THE SECOND BROOD OF *Colias Edusa* NEAR LEEDS.—Several specimens have occurred to me and my friends during the last week or two. On the 4th September my brother (Mr. Thos. Grassham) saw one taken by some lads near Gledhow ; the next day he took one on Adel Moor, when in my company, and after it had several times been seen. On the 15th I saw one in Brunswick-street, Leeds, and my wife saw another at Little London.—JOHN GRASSHAM, Leeds.

Colias Edusa IN CUMBERLAND.—Whilst out shooting in the neighbourhood of Armathwaite, last week, I saw and chased a fine specimen of *C. Edusa*, but being without net, I failed to capture it, much to my regret.—GEO BROOK ter., Fernbrook, Huddersfield, 26th September.

ANOTHER *Acronycta alni* AT WAKEFIELD.—I send you another larva of *Acronycta alni*, which a boy has just brought in, taken here more than a week ago.—WM. TALBOT, Sept., 1877.

HYMENOPTERA.—On August 15th I went to Woodsome by way of the Hall, and the old limetree in the yard was in full bloom ; on it were thousands of bees of various species feeding. I was rather surprised to find hundreds of dead ones under the tree, but they all appeared to be of one species—the black one with yellow rings. I picked a large chip-box full in about two yards space. I should feel much obliged if some other entomologist could throw any light on this curious circumstance.—JAMES VARLEY, Almondbury Bank, Huddersfield, August 21st, 1877.

[By the kindness of Mr. Porritt I have had under examination a number of the dead bees mentioned in Mr. Varley's communication. They appeared to me to be workers of the common species, *Bombus lucorum*. With a view of throwing further light on the subject, I sent a few of the specimens to Mr. Frederick Smith, of the British Museum, who is the chief authority on the order Hymenoptera. He confirmed my determination of the name, and then stated that he noticed that the abdomen of nearly all appear to have been emptied of their contents, and most have lost their heads. He then suggested the probability of their having been killed by birds—perhaps by a butcher-bird. He knows that this bird feeds with avidity on humble-bees, and once saw a shrike flying about in a bean-field where *Bombi* were plentiful, catching them, then settling on a gatepost for a few seconds to devour portions of its prey and then off again for fresh captures. He concludes that he can only conjecture that a shrike or other insect-feeding bird had destroyed the bees under the limetree. Of course the presence of a large number of bees in any one place would naturally attract the attention of such birds, and the result would be the large deposit of dead bodies at the same spot.—W.M. DENISON ROEBUCK.]

CAPTURES OF RARE LEPIDOPTERA AT DEAL.—I arrived home from a collecting expedition to Deal, on August 30th, having taken the following rare species, besides many commoner ones:—*Lithosia pygmaeola* (I was just too late for this, as many were worn out); *Sterrhia sacraria*, one male specimen; *Leucania albipuncta*, one; *Laphygma exigua*, two—one very fine, the other very poor; *Heliothis peltigera*, two; *H. armigera*, one female, which has deposited eggs; *Spilodes sticticalis*, only one; *S. palealis*, a few; *Margarodes unionalis*, two; *Mecyna polygonalis*, two; *Melia anella*, eighteen; *Colias Edusa*, var. *Helice*, eight specimens.—W. H. TUGWELL, 3, Lewisham-road, Greenwich, Sept. 3rd.—[This is the best list of captures we have read for a long time.—*Eds. Nat.*]]

Stilbia anomala NEAR BRADFORD.—On the 9th of August last I took a single specimen of *Stilbia anomala*, at Shipley Glen, near Bradford; it was flying over a bed of ling (*Calluna vulgaris*). I believe this is the first record of its occurrence near here.—J. W. CARTER, Manningham, Bradford, Sept. 14th.—[We believe this is the first record of the occurrence of *Stilbia anomala* in the West Riding.—*Eds. Nat.*]]

Carabus nitens ON GREETLAND AND ROMBALDS MOORS.—I may state, for the benefit of Mr. Crowther and others who are interested in the geographical distribution of *Carabus nitens*, that in 1870 I took a specimen of this beautiful beetle on Greetland Moor, near Halifax; since then I have taken one, and seen two or three, from Rombalds Moor, near Bradford. I believe it might frequently be found at the latter place.—J. W. CARTER.

Rainfall for August.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL. TO DATE.		Date of heaviest Fall.	Amount of heaviest fall.
				1877.	1876.		
Huddersfield (Dalton)..... (J. W. Robson.)	Ft. 350	In. 4·02	21	25·63	*19·40	22nd	0·66
Wakefield..... (F. Hill.)...	120	3·87	20	22·86	...	25th	0·74
Leeds ... (H. Crowther.) ...	183	4·08	20	22·56	...	25th	0·70
Halifax	360	6·40	23	37·75	...	15th	...
Barnsley .....(T. Lister.) ...	350	4·32	22	...	...	25th	0·93
Ingbirchworth ... (Do.).....	853	6·26	23	...	...	25th	0·90
Wentworth Castle (Do.).....	600	...	...	...	...	...	...
Goole... (H. F. Parsons.) ...	25	5·35	16	18·77	13·63	15th	1·23

* This is the average to date for 11 years, 1866-76.

Reports of Societies.

BRADFORD NATURALISTS' SOCIETY.—Meeting Sept. 4th, Mr. Illingworth in the chair.—Messrs. Bower and Hebblethwaite exhibited cases of insects taken by them at Monkswood, amongst which were *Argynnис Paphia*, *Thecla quercus*, *T. Betulæ*, *Colias Edusa*, *C. Helice*, *G. Rhamni*, *Arge Galathea*, &c. A fine specimen of *Vanessa Polychlorus*, taken in Priestman's Mill, Manchester-road, was exhibited ; Mr. Carter, fine specimens of *Vanessa Cardui*, bred from larvæ taken in the district ; Mr. Illingworth, larvæ of *Saturnia carpini*, *Smerinthus populi*, and specimens of *Polia Chi*, var. *olivacea* ; Mr. Soppit, a fine specimen of *C. Edusa*, taken at Low Moor, Aug. 15th.—H. T. S.

GOOLE SCIENTIFIC SOCIETY.—The last excursion of the season was made on Saturday, Sept. 15th, to Snaith, Carlton, and Camblesforth Common. At the latter place the party were met by several members of the Selby Naturalists' Society. Sections were examined of the new red sandstone between Carlton and Camblesforth, and of the alluvial sand at Camblesforth Common. In spite of the season being so far advanced, 161 species of Vasculares were observed, including two not before recorded in the neighbourhood, viz. :—*Senecio saracenicus*, and *Hieracium tridentatum* ; also *Thalyctrum flavum*; *Stellaria aquatica*, *Rhamnus Frangula*, *Œnanthe fistulosa*, *Œ. Phellandrium*, *Chærophyllum anthriscus*, *Carduus nutans*, *Gnaphalium sylvaticum*, *Bidens cernua*, *Hottonia palustris*, *Scolopendrium vulgare*, and *Equisetum sylvaticum*. The mosses (14) and lichens (11)

found during the day presented nothing special ; among the fungi (18) were *Agaricus rubescens*, *A. speciosus*, *Paxillus involutus*, *Marasmius Rotula*, *Boletus chrysenteron*, *Licea fragiformis*, *Phragmidium bulbosum*, *Coleosporium petasitis*, and *Claviceps purpurea*—the “ergot of rye,” famed for its use in obstetric medicine. A good many mollusca were found, but of common kinds. Arrangements were made for the winter season. It was resolved that the hour of meeting should be altered from 6 p.m. to 7 p.m., and that meetings should be held fortnightly during the winter ; meetings for the exhibition of specimens alternating with those for the reading of papers. It was agreed that the Yorkshire Naturalists’ Union should be invited to hold a meeting in 1878 at Brough.—H. FRANKLIN PARSONS, Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting, Sept. 15th, in the Museum, South-street, the president, Mr. C. P. Hobkirk, in the chair.—The exhibitions were numerous, and included—Geology : *Hamites maximus*, from Folkestone, and *Fusus porrectus*, from Hants, by Mr. S. D. Bairstow ; granite and quartz pebbles from a gravel bed half-a-mile from the present river bed, found when cutting the new canal between Horbury and Thornhill, by Mr. S. L. Mosley. Botany : *Goodyera repens* from Armathwaite, Cumberland, by Mr. George Brook ter. ; also the same plant along with the following, from Gordon Castle, by Mr. John Conacher :—*Narthecium ossifragum*, *Gymnadenia conopsea*, *Trientalis europaea*, *Hypericum perforatum*, *Hydrocotyle vulgaris*, *Eriophorum vaginatum*, *Galium palustre*, var. *Witheringii*, *Polytrichum gracile*, *Juncus obtusiflorus* and *J. effusus*, &c. Lepidoptera : Mr. G. T. Porritt, a box of various species taken by himself in the New Forest this season, including *Lithosia quadra*, *Selidosema plumaria*, *Catacola sponsa* and *promissa*, and many others ; also full-grown larvae of *Stenopteryx hybridalis*, reared from eggs deposited by a moth from the same locality. Mr. Mosley showed splendid varieties of *Vanessa urticæ*, *Chortobius Pamphilus*, *Arctia mendica*, and *Polia flavocincta*—all taken or bred at Bradford : also a larva of *Colias Edusa*, and preserved larvae with imagos of *Cidaria sagittata*. He also read some extracts from a letter received from Mr. Tasker, from Switzerland, stating that *Colias Edusa* had been exceedingly abundant there this season, as in England, and that now the second brood was flying in large numbers ; all the specimens he had taken, however, were males. Mr. S. D. Bairstow, *Larentia olivata* from Wales. Hemiptera, Homoptera : the following taken in the district by Mr. Mosley :—*Arytaena ulicis*, *Psylla Forsteri*, *P. alni*, *P. fraxinicola*, and *P. mali*. Mr. George Brook shewed Mr. Norman’s slide of the micro spores of truffle, termed the “halo slide,” from the singular fact that when looking through it at a light, the light appears surrounded with a number of rainbow-coloured halos. The slide created great interest.

LEEDS NATURALISTS’ CLUB AND SCIENTIFIC ASSOCIATION. — 260th meeting, August 21st, the president, Mr. Jas. Abbott, in the chair.—Mr.

W. H. Broadhead exhibited a case of lepidoptera from Lytham ; Mr. B. Saynor *Daphnia pulex*, showing circulation and the beating of the heart ; and eyes of dragon-fly ; Mr. G. R. Cull, a living long-eared bat (*Plecotus auritus*, from near Harrogate. The secretary stated that he formerly met with it at Pannal, near Harrogate, but it was not so common as *Vesper-tilio pipistrellus* was. Mr. Edward Thompson exhibited eggs of razorbill and lesser black-backed gull, from Bridlington ; Mr. H. Pollard exhibited distorted specimens of *Helix nemoratis* from Hunslet and Whitby ; and Mr. J. R. Murdoch showed the same species from Port Soderic, Isle of Man.

261ST MEETING, August 28th—Mr. James Abbott, president, gave his inaugural address, postponed from last April, from unavoidable causes. Commencing with criticisms on the Society's methods of operation, and suggestions for its improvement, the latter part of the address dealt with the latest researches and views with regard to the classification of the lower forms of life.

262ND MEETING, Sept. 5th.—A very successful conversazione, nearly 300 persons being present, and about 60 members taking part in the entertainment.

263RD MEETING, Sept. 11th, vice-president Mr. William Nelson in the chair.—Donations of books were acknowledged by vote of thanks ; the like was accorded to a donation from Mr. A. Peckett Taylor, of Mapplewell, of boulders found in some fallow-fields about one mile east of the Carlton railway cutting, near Barnsley ; the stones were water-worn, and some appeared foreign to the district. Mr. Washington Teasdale showed a series of slides of carboniferous Polyzoa and of Yorkshire coal-fossils, prepared by Mr. G. R. Vine, of Attercliffe, and various fossil slides prepared by Butterworth, Binns, and other microscopists. Mr. Henry Pollard showed two examples of *Helix hybrida*, and distorted ones of *H. hortensis* and *H. arbustorum*, all from Settrington, near York. Mr. John W. Taylor brought *H. candidissima*, *H. setubalensis*, *H. bætica*, and *H. cariosula*, to show the character of Helices inhabiting desert regions. Mr. W. Denison Roebuck showed *Polistes biglumis* and nest, brought by Dr. Parsons, from Zermatt, Switzerland, where it was very frequent on warm granite rocks, and less frequent on bushes. The nest was very characteristic of the genus, and strikingly unlike the allied genus *Vespa* (true wasps and hornets). Mr. Henry Marsh showed specimens of *Colias Edusa*, and other members reported its occurrence (see note at p. 39 of this Number).

NOTTINGHAM WORKING MEN'S NATURALISTS' SOCIETY.—Meeting July 2nd, Mr. W. Rigby, president, in the chair.—Mr. J. Fox exhibited a number of larvæ of the following :—*C. Scrophulariæ*, *B. Rubi*, *L. Quercus*, *L. quercifolia*, and *C. Ligniperda* ; Mr. R. Wix a complete collection of British butterflies, also the following moths :—*C. nupta*, *D. euphorbiæ*, *D. galii*, *A.*

Atropos, *S. convolvuli*, *Z. minos*, and *C. porcellus*: the secretary (Mr. W. Wright) a few hybernated specimens of *Colias Edusa* and *Cynthia cardui*, taken at Colgrave on June 22nd: he also reported having seen *Vanessa Antiopa*; Mr. G. Minnit, a very fine collection of shells, which were much admired. A fine head of the Bewick's swan was presented to the Society by Mr. J. Brown. Messrs. H. Turton, W. Rigby, W. Morley, F. Gent, W. Watchorn, and G. Westby exhibited a large variety of botanical specimens.—W. WRIGHT, Sec.—[Were the larvæ called *Cucullia scrophulariae* really of that species? We believe nearly all the specimens labelled as this moth in British collections are in reality only *C. verbasci*.—Eds. Nat.]

OVENDEN NATURALISTS' SOCIETY.—The members had a ramble on Saturday, Aug. 4th, the district chosen being Elland—the canal side, the woods, and pit-hills. The following is the result:—In botany (Mr. C. Sheard naming the plants), *Lycopus Europæus*, *Sagittaria sagittifolia*, *Lapsana communis*, *Linaria Cymbalaria*, *Epilobium hirsutum*. Messrs. Cockcroft and Spencer collected a good number of geological specimens, which were named and described by the latter, amongst them being *Posidonomya*, *Goniatites Listeri*, and *Looneyii*, fossil-wood from the baum pots, *Macrospores*, and *Lepidodendron*.

ORDINARY MEETING, August 18th, Mr. T. Scott, president, in the chair.—Mr. C. Sheard named the botanical specimens, including *Cnicus pratensis*, *C. arvensis*, *Hypericum perforatum*, *Genista tinctoria*, *Convolvulus sepium*, *Stachys arvensis*, *Oenothera biennis*, *Geranium pratense*, *Pyrola minor*. Mr. T. Hirst exhibited the following birds:—Summer drake, grey plover, thick knee, or Norfolk plover. Mr. J. Spencer brought some rare specimens in geology, amongst which were *Mellania striata*, *Bellerophon urie*, *Nuculi*, *Linguli*, *Lepidodendron obovatum*, *Orthoceras*, *Goniatites Listeri*, and *Posidonomya*. Mr. J. Ogden exhibited lepidoptera, viz.:—*Macroglossa stellatarum*, *Bombyx trifolii*, also the hymenopterous *Sirex gigas*.—J. OGDEN, Sec.

RASTRICK AND BRIGHOUSE NATURALISTS' SOCIETY.—Monthly meeting, 10th Sept., Mr. E. S. Cooper in the chair.—A fine collection of botanical specimens, numbering 90, were exhibited, and were named, at the request of the chairman, by Mr. G. B. Wentworth. Among the least common were *Sparganium ramosum*, *Bidens tripartita*, *Chenopodium hybridum*, *Mentha piperita*, *Lamium intermedium*, *Bartsia Odontites*, &c. Mr. Wentworth also mentioned the discovery of a new plant in the district, viz., "touch-me-not," or yellow balsam (*Impatiens noli-me-tangere*).

SELBY NATURALISTS' SOCIETY.—30th Meeting, June 20th, ramble and meeting at Riccall Common.—Amongst the botanical specimens collected were *Gentiana Pneumonanthe* (in abundance, but not in flower), *Drosera rotundifolia*, *D. intermedia*, *Hypericum elodes*, *Menyanthes trifoliata*, *Listera ovata*, *Habenaria chlorantha*, *Salix repens*, *Reseda luteola*, *Hottonia*

palustris. The captures of the entomologists included—*V. cardui*, *C. pamphilus*, *S. ocellatus*, *F. atomaria*, *P. gamma*, *A. myrtilli*. The most noteworthy birds discerned during the day were—the laughing gull (*Larus atricilla*), stonechat (*Motacilla rubicola*), curlew (*Numenius arquata*), redshank (*T. calidris*), widgeon (*Anas penelope*), waterhen (*Gallinula chloropus*).

31ST MEETING.—Ramble to Bishops Wood.—Plants collected : *Polypodium vulgare*, *P. Phegopteris*, *Aspidium aculeatum*, *Lomaria spicant*, *Thalictrum minus*, *Lysimachia nemorum*. The only noteworthy bird observed was the pied woodpecker ; perfect insects of gray dagger *A. psi*, *A. leporina*, *A. megacephala*, *A. rumicis*, *M. albicillata*, *M. substristata*. Larvæ of the following :—*L. monaca*, *J. Io*. — W. N. CHEESMAN, Hon. Sec.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly meeting, Sept. 6th, Mr. E. Wrigglesworth in the chair.—Mr. Taylor exhibited larva of *F. Piniaria*, and reported the taking of *Acronycta alni* in Haw Park, on the 23rd August ; he would have exhibited it at the meeting, but it had made up. Mr. Sims exhibited *A. fuliginosa* and *N. Zizzac*. Mr. Wrigglesworth exhibited the following beetles :—*Carsida viride*, *Phrysonida distinguenda*, *Phyllapertha horticolor*, *Xanthalium fulgidus*, *Agabus mahilutris*, *Sebia chlorocephala*, *Otishynchus picipes*, *Atheris haemorhoidalis*, *Geotrupes vernalis*. Mr. H. Latham exhibited *Epiera diadema*, the geometrical spider.—J. SPURLING, Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting, Sept. 12th, Mr. M. Smith in the chair. Mr. Wm. Simmons exhibited the following specimens in fine condition, nearly all of them bred :—*Notodonta Chaonia* ; *Heliothis peltigera*, *Acronycta strigosa*, *Apamea Ophiongramma*, *Eupithecia consignata*, and *debiliata*, *Macaria alternata*, *Anticlea sinuata*, and *Lithostege griseata*, also a fine preserved larva of *Acronycta alni*, taken by his son at Sherwood Forest in August last. The chairman exhibited the following species of coleoptera :—*Sirica brunnea*, *Gonioctena viminalis*, *Clivinia fossor*, *Cryptorhynchus lapathi*, and *Rhogium inquisitor*. Mr. R. Crook, bred specimens of *Hadena protea* and *Agrotis agathina* ; Mr. Robinson *Dicranura furcula*, *Crambus inquinatellus*, *Phycis abietella*, rare in this district, *Pempelia palumbella* and *Retinia pinicolana* ; Mr. R. Dutton, *Colias Edusa*, taken at Methley. Mr. G. C. Dennis, a fine box of insects taken at Sherwood Forest in August last ; amongst them were the following :—*C. Edusa*, *Sesia cynipiformis*, new to the district, *Noctua glareosa*, *Euperia fulrago*, *Crambus pinetellus*, &c. ; the secretary, *Acidalia auroraria* and *Crambus Warringtonellus*, taken on Thorn Waste, the specimens probably new to Yorkshire ; *Cosmia pyralina* and *Stilbia anomala*, taken in Sherwood Forest ; Mr. C. Helstrip, an albino specimen of the jay—*Garrulus glandarius* ; Mr. Ripley, a specimen of the armed bullhead—*Aspidophorus Europaeus*, also a specimen of the knot—*Tringa cineria*, and the gannet *Sula bassana*, from near Malton. Mr. C. D.

Wolstenholme, eggs of the noddy tern, *Sterna stolida*; roseate tern, *S. Dougallii*; whiskered tern, *S. leucoparcia*; sooty tern, *S. fuliginosa*; and the gull-billed tern, *S. anglica*. Mr. T D. Smith, some small bones from the ear of a whale. Mr. Postill, a bronze spear head, in remarkable preservation, found near Helmsley Blackmoor.

YORKSHIRE NATURALISTS UNION.—The sixth meeting of the year was held in the Halifax district, the hunting grounds being Greetland and Norland Moors and North Dean Wood, and the subsequent rendezvous the Dining Hall and Schools at Copley, attached to Messrs. Akroyds' mills. After the tea and the meetings of Sections, the general meeting was opened in the large schoolroom at 6-15 p.m. The Rev. W. Fowler, M.A., of Liversedge, president, in the chair; the attendance at the meeting was about 80. Twenty-two societies—a larger number than usual—were represented, the three absent ones being the Honley and Middlestown Naturalists' Societies and the Sheffield Naturalists' Club. The usual votes of thanks to the additional subscribers to the Union having been passed, the Sectional Reports were given. Mr. Talbot, of Wakefield, president of the Vertebrate Section, stated that but few birds had been observed, either on Greetland Moor or in the woods above the Calder valley. There were but four summer migrants—the willow warbler, swallow, martin, and sand martin; eighteen resident birds, including the magpie, jackdaw, rook, ringdove, peewit or lapwing, kestrel, skylark, titlark, blue tit, pied wagtail, blackbird, missel thrush, yellow bunting, common or corn bunting, and song linnet. Mr. Thomas Lister, of Barnsley, the secretary, agreed with Mr. Talbot as to the small number of birds compared with those seen at the Goole excursion, when ten summer migrants, twelve wading and swimming birds, and nearly thirty resident birds were observed. But the locality and the season account for the difference, as in plants—species abounding at Goole peculiar to heath, grove, or tidal rivers, not occurring near Copley. Mr. Lister further stated the sea and marsh birds, he had observed at Goole he had seen more abundantly in the noble estuaries of the Dart and Tamar, and on the sea-cliffs of Devon and Cornwall, from Torquay to the Lands' End, when he had fulfilled the trust the Union had honored him with, as delegate to the meeting of the British Association at Plymouth. He had there supported the action of the short time committee in protecting birds during the breeding season. Mr. Caius Cassius Hanson, of Stainland, gave an account of birds noted in the Halifax district as follows:—Aug. 16th, the swift last seen; Aug. 25th, a dunlin shot on the Calder; the barn owl and short-eared owl shot on the moors, and in July and August occurred kingfishers, goatsuckers, and cornerakes, the latter numerous,—while in other districts they were stated by members to be scarce. Mr. John Conacher, of Huddersfield, the only conchologist present, stated that on account of the absence of collectors not a single shell had been found. For the Entomological Section, Mr. G. T. Porritt, F.L.S., secre-

tary, said that but little had been done by the Section, as it was the wrong time of year for the district. The only noteworthy species was *Acronycta menyanthidis*, taken in the larval state on ling. The green form of the larva of *Eupithecia nanata* was noticed to be about as plentiful as the usual red form. In Hymenoptera were taken on Greetland Moor some specimens of *Bombus lapponicus*, a species peculiar to mountainous regions; also a nest of *Bombus lucorum*, and examples of *B. muscorum* and *Apis mellifica*. A letter was read to the Section from the Rev. Thomas Blackburn, B.A., of Honolulu, Hawaiian Islands, in reply to a resolution of the Section to the effect that if possible he would continue his paper entitled "Outline Descriptions of British Coleoptera," published in the "Scottish Naturalist," but which had been relinquished on his leaving Britain. Mr. Blackburn entered at length into his reasons for not doing so, and the Section was quite satisfied that, under the circumstances, it was quite impossible for him to comply with the request contained in their resolution. He gave a hope, however, that he might do it at some future time. Dr. Parsons, of Goole, secretary of the Botanical Section, reported that 169 species of flowering plants and ferns were observed during the day; this number was about 100 less than those seen at each of the last two meetings—Shipley and Goole—the falling off being due in great measure to the season being past its best. The most noteworthy species were *Ranunculus Lenormandi* (Norland Moor), *Geranium phænum*, *Myrrhis odorata*, *Senecio erucifolius*, *Matriaria chamomilla*, *Centaurea calcitrapa* (in a cornfield at Brighouse) *Jasione montana*, *Vaccinium Vitis-idaea*, *Lamium Galeobdolen*, *Salix pentandra*, *Sagittaria sagittifolia*, *Potamogeton pectinatus*, *Narthecium ossifragum*, *Lolium temulentum*, and *Brachypodium sylvaticum*. The Cryptogams found during the day were as follows:—Mosses, 23, including *Sphagnum contortum*, *Tortula convoluta*, *Racomitrium aciculare*, *Pogonatum aloides*, *Fissidens taxifolius*, and *Hypnum flagellare*; Hepaticæ, 10, viz:—*Jungermannia inflata*, *J. bicuspidata*, and *J. albicans*, *Scapania undulata*, *Alicularia scalaris*, *Calypogeia Trichomanes*, *Lepidozia reptans*, *Lophocolea bidentata*, *Pellia epiphylla*, and *Fegatella conica*; Lichens: *Parmelia saxatilis*, *Lecidea decolorans*, and *Cladonia macilenta*; Algæ: *Ulva crispa* and *Conferva bombycina*; Fungi, 14, including *Agaricus pantherinus*, *A. filipes*, *A. rutilans*, *A. rimosus*, *A. hypnorum*, *Lactarius quietus*, *Paxillus involutus*, *Boletus subtomentosus*, and *Scleroderma vulgare*. Mr. Jas. Spencer, chairman of the Geological Section, gave a full report (for which see page 49). The president announced that the next meeting would be the annual one, both for the Sections and the Union, for the consideration of annual reports and election of officers. Votes of thanks to Mr. C. C. Hanson, of Stainland, for his efficient services as local secretary; to Messrs. James Akroyd and Sons, Limited, for the use of the Schools; and to Messrs. C. W. Eastwood and T. F. Lambert, for permission to visit the moors and woods, concluded the proceedings.—**Wm. DENISON ROEBUCK, Sec.**

Diary.—Meetings of Societies.

-
- Oct. 2. Bishop Auckland Naturalists' Club. Liversedge Naturalists'.
,, 6. Yorkshire Naturalists' Union—Annual Meeting at George Hotel,
Wakefield—Council, 3-15. Sections, 4-30. Tea, 5. General
Meeting, 6 p.m.
,, 8 North Staffordshire Naturalists' Field Club—Excursion to Cannock
and Huntingdon, in conjunction with the Dudley Club.
Huddersfield Naturalists'.
,, 9. Leeds Naturalists' Field Club.
,, 10. York and District Naturalists' Field Club. Goole Scientific Society.
12. Huddersfield Scientific Club—Paper by Mr. G. T. Porritt, F.L.S.
,, 13. Heckmondwike Naturalists'.
,, 16. Leeds Naturalists' Field Club. Paper "Celestial objects for
common telescopes,"—Mr. John Garbutt, F.R.A.S.
,, 20. Huddersfield Naturalists'. Batley Naturalists', Annual Soiree.
,, 23. Leeds Naturalists' Club.
,, 24. Goole Scientific Society—Paper "A Naturalist's first impressions
of the Alps."—H. Franklin Parsons, M.D.
,, 30. Leeds Naturalists' Club—Paper on "The Potato,"—Mr. C. S.
Spence.
-

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Original Articles.

THE GEOLOGY OF NORLAND MOOR,

NR. HALIFAX.

BY JAS. SPENCER.

THE table land of which Greetland and Norland Moors form a part is about three miles in length by from half to three-quarters of a mile in breadth. Its highest part, overlooking the valley of the Ryburne, attains an altitude of about 900 feet above the sea level, from whence it gradually slopes down in an easterly direction, following the dip slope of the strata to North Dean, where it is about 400 feet above the sea. It is bounded on the west by the Ryburne valley, on the north and east by Calderdale, and on the south by West Vale and Greetland valley. It may be termed an outlier of the upper millstone grit rocks, and it owes its isolation to the scooping out of those valleys. The rough rock, or upper bed of the millstone grit rocks, forms the surface of the moors, covered lightly by peat and soil, and a few feet of debris. Under that occurs the valuable flag-rock so extensively wrought at Norland and on the flat above Greetland. Then comes a thick bed of shale, which brings us to the third grit series, comprising many beds of grit, shale, and sandstone, the most important being the one in the cutting on this side of Sowerby Bridge station, and one or two exposed on the new railway in the Ryburne valley. Over these sandstones thin bands of coal often occur.

The general arrangement of the strata in the hill is very regular, and unaffected by any large dislocations. Fossil plants are frequently met with in quarrying the sandstone beds, especially in the flag rock under the rough rock. I am not aware that the shale beds have hitherto yielded any fossils in this locality, but in other localities the same beds have yielded fossils abundantly. If ever these shales become opened out either by sinking through them or by mining, I have no doubt but that they will be found to be equally fossiliferous. I have been informed that similar grit shales near Ripponden are highly fossiliferous.

Having briefly described the strata under the area of the moors, I now wish to call attention to certain beds of sand, clay, gravel, peat, and buried forests, which form the superficial deposits overlying the stratified rocks. If a well be sunk anywhere in the middle of the valley of the Calder below Sowerby Bridge, say at North Dean, after passing through eight or ten feet of fine alluvial sand, covered by

ordinary surface soil, a bed of coarse gravel is met with, composed of local stones, under that there lies another, largely composed of local pebbles, but having also a great quantity of what, for brevity, we term "foreign boulders," consisting of granite, syenite, greenstone, trap, slate, quartz rock, limestone, &c., none of which occur about here, the nearest places being Westmoreland and Craven. The foreign boulders were brought here during the great "ice age," when the North of England was covered by a vast sheet, or sheets, of ice, in the form of many confluent glaciers, emanating from the high hills of the Lake District, from the Scotch mountains, and the higher parts of the Pennine chain, upon whose bosoms were borne immense quantities of rock and debris, which were scattered far and wide over the North and middle of England. Afterwards the country slowly sunk beneath a boreal sea, and only the higher parts of the Pennine chain and other hills stood above the sea level. During this period of submergence, icebergs careered over the sea and deposited their burden of rock and sand over the submerged land. After a time the land uprose again out of the sea, and another set of local glaciers began to form on the hills and upland valleys, which helped in a large measure to clear off the hills and out of the higher dales the debris left by the former glaciers and icebergs. We have evidence in this neighbourhood of all these movements of the land and sea, of the great glacier ice field, of the submergence of the land, of icebergs dropping their burden of rock, and of the final uprising of the land above the sea, and of the last local glaciers. That portion of the Pennine chain from Bouldsworth Hill southwards, is, on the eastern side, remarkably free from glacial deposits, while on the western side they rise to an altitude of 1,150 feet, and on some of the moors about Bacup they attain an elevation of 1,400 feet. It is only of late years that Calderdale has been known to yield these foreign boulders, and it is still a debatable question as to which way they came here. To any person who studies the topography of the Pennine chain, and the occurrence of glacial beds at such great altitudes on the other side, it would seem an easy matter for them to have come through passes such as Walsden and Clivigir, and so down Calderdale. But the problem is not quite so simple as that, for if they came in that way we should naturally expect to find some evidences of them in those passes, but of all the places in Calderdale these passes are the most barren in these foreign boulders. You can mount the steep flanks of the hill on either side of the Walsden pass at the western end, and trace these boulders up to heights of 1,150 feet, while in the pass itself, which is

less than 700 feet above the sea, you may search in vain for miles for them. In order to account for this singular anomaly, my friend, Capt. Aitken, of Bacup, has propounded a most ingenious theory, that in the early part of the ice age these passes became filled with local ice so as to effectually keep back the great sheet of ice coming from the west. I believe that this did take place up to a certain height, but several new facts which I have come across lately convince me that the great ice sheet did pass over the barrier of local ice, and flowed through Calderdale. Only very recently I have found boulders of encrinital limestone, highly polished, at a height of about 1,150 feet above the sea, at the edge of the moors near Pecket Well. This is the first, and so far, only instance of high level drift having been found on this side of the Pennine chain within the water shed of the Calder.

The neighbourhood has yielded many remains of pre-historic man. On the Greetland and Norland Moors flint flakes and arrow heads, &c., have been found, while on the Halifax side of the Calder, in a line ranging from Shaw Hill to Highroad Well, and thence by Camp End to Brockholes, and thence over Hunter-hill and Warley Moors to Nab End, overlooking Oxenhope valley, very many remains of pre-historic man have been found, and flint flakes in abundance. Buried forests occur at West Vale, and very extensively on many of our moors, especially on Fly Flat.

ON THE PROPOSED NEW MAP OF YORKSHIRE
FOR THE
YORKSHIRE NATURALISTS' UNION.

By F. ARNOLD LEES, F.L.S.

I. OBJECT IN VIEW.—The great ends to be served by the map we project should first of all be clearly understood. I would define them as a basis of discussion.

One intention—a minor end—is, I take it, that members of the Union going upon an excursion into a new district may, by the map, not only gain a clear idea of relative position, &c., but find it of use as an itinerary by which to shape their course. Grant this, and it follows the map must be of fair size! In my experience no map on a less scale than four miles to an inch is of much use in the field.

But the great end, the scientific purpose, our map must serve, is, that a member referring to it may not only be able to say of such flora or fauna as he may have found that they occurred in such and such a river-basin, near such and such a village, on such and such a common,—but *may be led* from the shading, colouring, or other indication marking the locality upon the map, to associate in his mind the *reasons why* the plants he found occurred where he found them. Can we suggest such a connection upon a map at all ? I think we can.

II. FEATURES GOVERNING DISTRIBUTION.—What, then, we must first ask, are the features which most potently govern or influence the distribution of plants and animals over any tract such as our county ? These it is we must express before everything else upon our map. In two words, they are *climate* and *soil* ; but since we can hardly mark these in their collective sense upon a map, we must analyse the various influences bound up in the words, and see if we cannot express these.

Accumulated experience has shown that the climate of a tract depends upon a complexity of circumstances. Briefly, these are—its altitude above sea-level, determining its mean annual temperature ; its aspect, its exposure to winds ; and the average amount of moisture in the air, its humidity and rainfall. Plants and animals have their likes and dislikes in regard to all of these ; they are the chief factors in the sum of distribution. As we leave the sea and follow a river upwards towards its source, the loftier level we reach the colder it is upon the average of the year, the more exposed to wind it is, and the more rain falls. The greatest rainfall actually happens not to be upon the highest peaks, but in the little valleys below them ; this, however, does not invalidate my general proposition. With these changes in climate comes a change in flora and fauna. Some plants loving warmth, a high annual temperature, and little moisture, gradually disappear ; and taking their place upon the hill-slopes, in part, but never wholly compensating their loss as to number of species, we find others, montane in type, whose conditions of life are ampler. Now, we can upon a map express these climatal conditions *by adopting certain zones or belts of altitude*. In Yorkshire we have three easily discriminated. The lowest one, the Mid-Agrarian, embracing all the surface at a lower elevation than 300 yards, its upper line indicating the limit at which wheat can be grown to ripen ; the middle one, the Super-Agrarian, between 300 and 600 yards, its upper line the limit of *Pteris aquilina* in Yorkshire ; and the highest one the Infer-Arctic, all that surface above 1800 feet.

Secondly, the *soils*, for which plants have preferences, depend not so much upon the very varied chemical differences in the strata underlying them as upon the broad and well-marked lithological peculiarities of the different groups of rock. These peculiarities, chiefly in their varying behaviour under the disintegrating action of water, influence the soil. There are two great (and one intermediate) types of rock in respect of mechanical constitution, corresponding with which all the soils in the county are divisible into three correlative groups. One type of rock is hard, yields *detritus* sparingly, yet as a mass is cracked and fissured so that water runs off it easily. Such are the oolitic, permian, and scar-limestone strata. The other great type is hard as to its siliceous particles, but these are bound together in a more pliable matrix, it is easier abraded by weather, in beds it holds water above it, and often where shaly and clayey bands are interposed in it too. Such are the slates, gritstones, and coal shales.

The soils covering the dysgeogenous (first-named type) rocks are often scanty, but always dry, warm, fertile, and richer in their admixture with vegetable *humus*. The soils overlying the grits are heavier, wetter, less fertile; those overlying the clays and coal shales typically cold, stiff, and wet.

There is a third type of rock, represented by the red sandstones, liassic, and Yoredale limestone shales, which are lithologically of intermediate character. So are their soils intermediate, sandy, and rather dry, and fairly fertile, or dampish but calcareous and rich.

These three kinds of rock have, then, not only a great effect upon the configuration of the hills and valleys—the scenery, but greatly influence the vegetation above them; and these, I would suggest, are all the soil differences it is really necessary to express upon our map. They show a broad geology, and point the main ascertainable features of phyto-geography. For no plants (so far as is known) is one particular kind of limestone earth a necessity; so that the advantage on our map of showing upon it the strike-lines of the upper and lower oolites, of the various grits, and of the upper and lower permian strata, would be *nil* so far as the distribution of plants and animals is concerned. Where we do find a few species restricted to one particular stratum, say the scar-limestone, it is not that they prefer that rock to any other, but it is due to that accident of altitude that within our area the upheaval of scar-limestone alone gives.

III. REMARKS ON RIVER-BASIN DIVISION.—A division into river-basins has only one very small advantage over the most arbitrary and artificial parcelling out of an area into squares, or whatever else is

possible ; and it has the disadvantage in the West-Riding of including nearly every variety of climate and soil within the limits of each drainage basin. The valleys of the Riding, being long and narrow, cut through the geological formations almost at right angles. The only purpose river-basin or any other divisions not climatic or geologic serve at all is the enabling a census of superficial distribution to be made. When made, we can by it tell only whether any given species is local or general or frequent, as it occurs in less than a third, or more than two-thirds of the divisions adopted. It has no other use than this—it tells us nothing as to why the plant is restricted to one district or found in many, because it tells us nothing of the conditions as to climate and lithology of such districts. Upon these depend species' occurrences or absences, and in our county our river-basins are far from coinciding with geological conditions. Still it is not quite correct to say that "the flora of two mountain streamlets arising in the same range, and flowing in opposite directions into distant oceans, would resemble each other far more closely than the flora of a mountain torrent would that of the same stream when it had become a slow navigable river." If the hill-range were lofty, and the streams flowed east and west, or south-west and north-east, the flora would very probably differ greatly (as happens in Yorkshire to the rivers Lune and Wenning, running west) by reason of the new factor of climate, different exposure, &c., introduced ; whilst as the mountain stream enlarged and became a river, it would retain for a very long way down a certain proportion of the floral characteristics it showed near its source. Upon the banks of the main stream and larger streamlets, long after they have entered upon the gritstone tracts in Airedale, Wharfedale, and Nidderdale, do species of plants occur, even more luxuriant in size than in their real home—telling the story of how winter-torrents and floods of old, dislodged dormant roots or seeds from their crevices high up among the hills, washed them down to deposit them in the back-washed mud of river creek or alluvial drift overlying a stratum whose *detritus* alone would not support their life. The gritstone of even triassic tracts are enriched with many species in this way, whose homes are properly far away, and often thus the natural flora is masked and confused by the adventitious one, as much as the real geology is by the overlaid drift and gravel.

Hill ridges, too, if lofty, even if looking N W and S E, do often present an impassable barrier to plants. This is only not true of grasses, compositæ, and those plants whose berries and seeds are to any extent the food of birds.

Our map may be made (without overloading it with detail—avoid that !) to show two other very important factors in the distribution of plants besides the geological one. To one of the conditions of division which have been named,—viz., that the boundaries of the adopted tracts must be well defined and easily recognisable ; I have, however, this to remark : I fear it cannot be done if “roads, railways, and rivers, or, failing these, parish boundaries,” are to be taken, for they nowhere coincide exactly I fear, at any rate for far, with “the sinuosities of the lines of strike” any more, I may add, than do the river-basin divisions. If our divisions are to be geological, let them be geological, and as accurate as map-scale will allow as to strike-lines, and trust (for we must anyway leave something to the intelligence of the user of the map) to the finder of a plant near a border-line to decide on what stratum he gathered it.

IV. PLAN OF DIVISION PROPOSED.—My plan is this : to make the map of practical value in four ways, and upon it I would show clearly four things.

1.—*The five vice-comital divisions* used in H. C. Watson's works on Topographical Botany, viz : N E, fifth ; S E fifth ; N W, mid-west, and S W, fifths. Show these clearly by some bright distinctive lines. For artificial divisions of area they are quite small enough for the purpose of making any census likely to be useful. Very few species of plants save the 380 ubiquitous ones, such as the daisy, dandelion, &c., will be found in all the divisions, and where one is absent there will nearly always be found a factor of distribution wanting also, and accounting for it.

2.—*Bring prominently out the two great physical features of the county.* The first of these is its division into an east and west slope (in section) by the great summit ridge of the Pennine chain that cuts off the western fourth. Mark this great water parting very boldly in some way—by a broad, deep blue line, say. You would find four rivers running S W : all the rest south-by-east, or east. From the fact of the summit-ridge cutting off winds, arresting moisture, &c., there is a different climate, and a different, more atlantic, flora upon the west slope to what there is upon east.

The second great physical feature is the cutting in half of the eastern portion thus formed, by the Ouse and alluvial vale of York.

This tract, a few miles on each side of Ouse from Goole to about Northallerton, has a climate of its own, a soil of its own, and a peculiar flora of its own, complex in its character because made up in several ways : just as the *detritus* from the western hills and the

eastern wolds deposited in this vale during long ages is made up of complex constituents. For our purpose Thorne Waste, as well as Riccall Common, would, upon the map, come within this tract.

3.—Most important in every way, I would have the area of our county divided into three different areas, by means of surface shading by fine parallel black or grey lines, each area limited by a contour line. Each of these would indicate the three zones of altitude and climate I have already described. Colour-washing would thus be left for my fourth proposed divisioning. The upper zone is only, in Yorkshire, small ; it covers little over 58 or 60 square miles. The surface area of middle zone, including the moorlands of the hill swells and spurs, is about 1200 square miles in extent. I would express this by fine parallel line shading; whilst the upper zone would be indicated by a deeper shading, viz., the cross shading of "hatching." The lower, or agrarian zone, I would have left unshaded. The three would thus be distinguished, and it is easily done by an engraver, wooden blocks being alone needed.

How would this apply in practice ? Well, I think—if a tyro found a wheatfield, a table of explanations on map border, or on an accompanying map-key of descriptive character—which I should be very glad to write for the Union—would tell him, and by reiteration impress it indelibly on his mind that he was in lower zone ; if he found *Pteris* or *Rubus Chamaemorus*, that he must be in middle zone ; if *Sedum Rhodiola*, that he was surely in upper zone. But much more than this would be suggested—and in time taught.

4.—The map should show those lithological features I have already indicated as influencing soil and distribution. Colour-washing should here be used. Let the porous strata, chalk, oolites, permian tract, and scar-limestone be washed-in in various shades of green (hinting at their being most verdant botanically), the tracts of eu-geogenous rock various shades of umber-brown to grey—the latter hue for the coal-measure tract. The Lias strip, and Trias tract, drift-hid, can be coloured pale yellow or salmon-hue, and also in this shade the sandy tract of Holderness : these tracts holding lithologically intermediate position. The vale of York, which I have already indicated as important to be defined, will within its contour line coincide very closely with the Triassic tract. Plant-species can then be recorded systematically as occurring in zone 1, 2, or 3 ; upon Holderness sand (1), chalk (2), oolite (3), lias (4), trias sand (5), permian (6), coal-measures (7), gritstone (8), Yoredale shales (9), mountain limestone (10), and silurian slate (11).

Of these eleven, Nos. 2, 3, 6, and 10 are *dysgeogenous* strata.

Nos. 1, 5, 9, and 11 are *sub-dysgeogenous* strata.

Nos. 4, 7, and 8 are typically *eu-geogenous*.

The basaltic upheaval at the extreme north-west corner furnishes a few distinctive plants. The soil would class as belonging to the sub-dys-geogenous rocks, and the area might be marked by a deep red lines or dot-shading in the north-west, where it occurs.

The narrow strip of old red Devonian strata which crop up in Rawthey-dale are of no importance botanically, but might be marked upon our map as a bright brown zigzag line, if wished.

In conclusion, I would say, if it is permissible, let it not be forgotten that the great want to be met by our map is to supply the less learned or wealthy amongst us with something that, every time they use it, will be to them a lesson in scientific botany, by suggesting to them an association, a relation between the plants they may find on any spot, and those broader climatic and geologic facts upon which their presence depends.

Market-Rasen, Oct 5th, 1877.

Rainfall for September.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL. TO DATE.		Date of heaviest Fall,	Amount of heaviest fall.
				1877.	1876.		
Huddersfield (Dalton)..... (J. W. Robson.)	350	4.73	13	30.36	*22.99	14th	1.42
Wakefield (F. Hill.)...	120	2.62	8	...	...	2nd	0.98
Leeds ... (H. Crowther.) ...	183	3.79	9	26.35	...	14th	1.50+
Halifax §	360	...	...	...	...	...	...
Barnsley .....(T. Lister.) ...	350	3.22	14	...	...	2nd	1.32
Ingbirchworth ... (Do.).....	853	4.93	16	...	...	2nd	1.32
Wentworth Castle (Do.).....	600	4.02	12	...	...	2nd	1.21
Goole... (H. F. Parsons.) ...	25	2.93	14	21.70	16.72	2nd	1.11

* This is the average to date for 11 years, 1866-76.

+ 1.05 on 2nd, and 0.90 on 13th.

§ No returns.

N.B.—Would our correspondents kindly furnish the information required to fill up the columns, as comparisons with previous years are instructive?—*Eds. Nat.*

Short Notes and Queries.

Thaïs Rumina IN BRIGHTON.—Mr. Dowsett, of North-street, Brighton, showed me, last Saturday, a specimen of this butterfly, which had been recently caught in the Brighton Market. From the nature of the place of its capture there can be no doubt that the insect had been brought into this country with fruit, vegetables, &c., from the Mediterranean district.—H. Goss, Surbiton Hill, Surrey, October 11th.

Colias Edusa IN COTTINGLEY WOOD.—On the 30th September last I caught a fine male specimen of *Colias Edusa*, doubtless the second brood, at rest on the flowers of *Senecio Jacobaea*, near Cottingley Wood. This is the first specimen I have met with in this locality. Last Saturday, (Oct. 6th), whilst collecting cocoons of *Saturnia carpini* on Harden Moor, I observed a merlin flying after what I thought was a flock of golden plovers. This beautiful falcon does not often visit this neighbourhood, but I have met with it on Barden Moor in the breeding season, where it doubtless breeds.—E. P. P. BUTTERFIELD, Wilsden, Oct. 15th.

Colias Edusa IN NORTH YORKSHIRE, &c.—I took a male *Colias Edusa* at Lartington (North Yorkshire), yesterday (Oct. 2nd). On Sept. 9th and 16th, I took about a dozen at Hartlepool, including two females. A hive of bees swarmed here on October 1st : is not this very unusual so late in the season ?—J. GARDNER, Egglestone, Oct. 3rd.

Colias Edusa AT WAKEFIELD.—I have had the good fortune to capture twenty-one specimens in very fine condition ; amongst them was a beautiful pale variety, which I think is *Helice*.—HENRY LUMB, Wakefield, Oct., 1877.—[We had the pleasure of seeing a number of these specimens recently ; the pale form is the var. *Helice*.—Eds. Nat.]

Colias Helice AT CHICHESTER.—During the month of August my brother and I took 45 *Helice*, nearly all in the finest condition, and, with one exception, all of them in the same field. They varied in colour from rich cream and primrose to greenish white, and showed considerable diversity in the size of the marginal spots, these in one or two instances being reduced to a minimum.—JOSEPH ANDERSON, Jun., Chichester.

Acherontia Atropos.—A fine specimen was captured in one of the streets of York, by Mr. C. D. Wolstenholme, on 14th Sept.—R. MARCHANT.

Acherontia Atropos.—In this district at least (Chichester) the season seems to be almost as remarkable for the abundance of the larvæ of *Acherontia Atropos* as for the swarms of *Edusa*, for which it will be long celebrated. I have had twelve in my possession.—J. ANDERSON, Jun.

LAUGHING GULL.—Is Mr. W. H. Cheesman quite certain that the gull reported by him from Riccall Common is the laughing gull ? Might it not be the black-headed gull (*L. ridibundus*), which I believe is called laughing gull, or laugher, in some districts ? — S. L. MOSLEY, Primrose-hill, Huddersfield.

Psylla alni.—This insect I believe was considered rare in England up to the time of Mr. Scott's monograph (Proc. Ent. Soc., London, 1876), but it has since been discovered plentifully near Norwich, and I found it very common in Mollicar Wood, near Huddersfield, on Sept. 30th.—**S. L. MOSLEY.**

Epeira scalaris (Walch), AT WHARNCLIFFE.—I took a beautiful specimen of this fine spider at the above place on the 19th Sept.—**S. L. MOSLEY.**

COLEOPTERA AT NORLAND MOOR.—The coleoptera taken at the Union excursion to Norland Moor on Sept. 8th, and which, through the kindness of Mr. Roebuck, are now in my possession, were *Nebria brevicollis*, *Pterostichus striola*, *P. madidus*, and *Calathus cisteloides*. — **HENRY CROWTHER, Leeds.**

Balea perversa. — I have to record the finding of the above, pretty abundantly, by Mr. Charles Smethurst, during damp weather at Grassingham, Craven.—**HENRY POLLARD, New Wortley, near Leeds.**

RARE PLANTS AT BOSHAM.—At the meeting of the Chichester and West Sussex Natural History Society, held here on October 9th, the following plants were exhibited :—*Centaurea Calcitrapa*, *C. solstitialis*, and *Inula Crithmoides*, found growing at Bosham, a little village by the sea, and about three miles distant from this town.—**JOSEPH ANDERSON, Jun.**

A CORRECTION.—Permit me to correct an error in the report of the meeting of the Wakefield Naturalists' Society. I exhibited the following beetles, and not the list you have published, which is altogether wrong :—*Cassida viridis*, *Chrysomela distinguenda*, *Phyllopertha horticola*, *Xantholinus fulgidus*, *Agabus maculatus*, *Sebia chlorocephala*, *Otiorhynchus picipes*, *Athous hoemorrhoidalis*.—**E. B. WRIGGLESWORTH.**

Reports of Societies.

BARNESLEY NATURALISTS' SOCIETY.—Monthly meeting, 3rd Sept., the president, Mr. T. Lister, in the chair.—Specimens of rocks and minerals brought by the president from Devon and Cornwall, were exhibited, from the Phoenix and Caradon tin and copper mines. He quoted the humane views of Lady Burdett Coutts on the probable extermination of humming birds, &c., for the vain objects of feminine decoration. The report of birds for the summer months in Barnsley district was brief. On July 22 a tern flew over the town south-west ; on the 3rd, eight sea-gulls of a large kind flew in the same direction ; a few more stragglers were noted, also sandpipers and herons in that month and August. In the latter month were observed kestrels, kingfishers, and the great snipe (very rare) in the Dearne valley. The only summer migrants noted up to September are—sand-martin, martin, swallow, yellow (or Ray's) wagtail), and willow

warbler. Mr. F. Brady reported *Colias Edusa* at Victoria-road ; by Mr. J. Harrison on Wakefield-road ; Mr. E. Massie, thirteen on Brierley Common ; Messrs. Fogg and Cook, one at Mount's Farm.

MONTHLY MEETING, Oct. 1st, the president in the chair, who read some notes sent him by Mr. W. J. Cope, of a few observations made by him at Dunford Bridge in July and August ; a pair of herons near the reservoir, July 25 ; five common gulls, Aug. 4. He noted the following birds up to August 22nd, nearly all breeding on the moors by the valley streams :—Golden plovers (numerous), grey wagtail, sandpiper, ring ouzel, twite, marsh tit, willow warbler, magpie, kestrel, all four of the linnet family, wild duck, &c. He also named three more *Colias Edusa*, seen near his house, Cockerham, Barnsley. This, with the one taken by Rev. W. Elmhirst, at Elmhirst, increases the number previously reported to about 25. The president reported on the summer migrants last noted : Ray's wagtail, Sept. 17th ; young wheatear, 19th ; same day willow warbler and chiffchaff, the latter heard in song by Dr. Payne, in his grounds, Newhill Hall, Oct. 2nd. Swallows noted Sep. 29th, and a martin Oct. 1st, in the town. Since the meeting, a pair of sand martins were seen at Hiendley Oct. 6th, and martins and swallows noted Oct. 12th ; the last are yet in the country to this date, Oct. 16th. Kingfisher, great spotted woodpeckers, and many gulls have been noted during the month. Mr. J. Harrison showed a box of lepidoptera bred by him :—*C. Edusa*, *E. orbicularia*, *K. abietaria*, *A. betularia*, *C. elinguaria*, *P. unguicula*, *A. Simiata*, *N. cucullina*, *E. liniariata*, *O. gonostigma*, *X. citrago*, *C. reclusa*, *A. leporina*. Communications on natural history were laid before the meeting.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting Oct. 16th, the president in the chair.—The evening was devoted to conversation and the exhibition of specimens. The following insects have been exhibited by Messrs. Firth, Carter, Andrews, and Lambert :—*H. pennaria*, *A. rufina*, *Noctua glariosa*, *Hadena protea*, and larvæ of *Notodonta camelina*. Mr. Illingworth reported on the business done at the Wakefield annual meeting.—H. T. S.

GOOLE SCIENTIFIC SOCIETY.—Meeting 10th Oct., the president, Mr. E. Hunter, F.C.S., in the chair.—Paper on “The Vulgar Superstitions of Yorkshire,” by Dr. Gibson, of Hull.

MEETING, Oct. 24th, for exhibition of specimens and conversation.—The following specimens were exhibited :—By Mr. Hunter, slides of diatoms, and leaves of *Deutzia*, bleached for polariscope ; by Mr. Bunker, fruits, gathered in Hertfordshire, of sweet chestnut, hornbeam, spindle tree, and traveller's joy ; the structure of which was described. A parcel of plants dried by Mr. T. B. Blow, of Welwyn, comprising *Statice caspia*, *S. occidentalis*, *Viola permixta*, *Arctium nemorosum*, and *Rumex rupestris*. Dr. Parsons gave an account of fresh-water algæ, and

exhibited, in illustration, slides of the following species collected by him during the past season :—*Lemania fluviatilis*, and *Nostoc verrucosum* (R. Frome, Somerset), *Batrachospermum moniliforme* (fr) (Swinefleet Warping Drain), *Ulva crispa* (Whitby), *U. bulbosa*, *Enteromorpha intestinalis*, *Closterium rostratum*, and *Oscillatoria nigra*, from Goole ; *Cladophora glomerata*, from Conisborough, *Conferva capillaris*, and *Fragilaria virescens*, from Shipley ; *Drapernaldia plumosa*, from Wetherby ; *Volvox globata*, from Howden ; and *Protococcus nivalis*—the celebrated red snow plant—from the Aletsch glacier, Switzerland. The specimens were mostly mounted in glycerine, by Hautzsch's evaporation method, which Dr. Parsons had found to answer well.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting October 12th, Mr. C. P. Hobkirk, president, in the chair.—Mr. S. L. Mosley said the insect exhibited by him at the last meeting as *Psylla mali* was not that species, but had been determined for him by Mr. John Scott as *P. peregrina*—a very recently discovered species. Mr. Mosley exhibited preserved larva of *Vanessa C-album* from Leominster ; he also recorded the occurrence of the rare spider, *Epeira scalaris*, from Wharncliffe. Mr. G. T. Porritt exhibited *Pterophorus acanthodactylus* from Berry Brow, entirely new to the district ; also specimens of *Melia anella*, taken by Mr. W. H. Tugwell at Deal, in August last. The president and secretary exhibited a new “Histological Student's Microscope,” recently constructed by Mr. Charles Collins, of London (price £5 10s.), which gave great satisfaction as a really good working instrument. Mr. Brook also explained a new and very satisfactory method of dry mounting with shellac (discovered accidentally by himself). Mr. Dore presented a specimen of the Colorado beetle (*Dolyphora decemlineata*). A very interesting paper was then read by Mr. G. T. Porritt, on “A Collecting Expedition in the New Forest.”

LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—264th meeting, Sept. 25th, the president, Mr. James Abbott, in the chair.—Paper read, “Ozone,” with original experiments, by Mr. Thos. Fairley, F.R.S.E., F.C.S., Leeds Borough Analyst.

265TH MEETING, October 2nd, Mr. John Grassham, V.P., in the chair.—A specimen of *Acherontia Atropos*, taken at Yeadon by Mr. Ernest E. Slater, was presented to the collection. On behalf of Mr. A. Peckett Taylor was exhibited *Sirex gigas* (male) from Mapplewell, near Barnsley, and other hymenoptera. Mr. Charles Smethurst showed *Sphinx convolvuli* from Rothwell Haigh, the specimen of *Colias Edusa* from Arthington Bank he previously showed alive, some American insects, and a specimen of *Oucullia asteris*, bred from Kentish larvæ ; slides of mosses by Mr. F. Emsley ; plants and fossils by Mr. S. Scholefield ; various insects by Mr. H. Crowther. On behalf of Lieut-Col. Child were shown living specimens of very young blindworms (*Anguis fragilis*), which he has successfully reared from the egg ; also living specimens of the animal full-grown, and of two lizards, *Lacerta agilis* and *Zootoca vivipara*.

266TH MEETING. October 16th, the president in the chair.—Paper read, “ Celestial Objects for Common Telescopes,” illustrated by photographs shown by the lime-light, by Mr. John Garbutt.—WM. DENISON ROEBUCK, Sec.

MIRFIELD NATURALISTS’ SOCIETY.—Meeting 13th October, the Rev. B. Wilson in the chair.—A lecture was delivered by the Rev. W. Fowler, M.A., entitled “ How Plants grow.” The lecture was illustrated by very interesting chemical experiments. This being the annual meeting, the secretary read his report, wherein he said that the society numbered 38 members. The library consisted of 37 volumes. The financial statement showed a balance in hand of £2 9s. 5d. The officers were elected, Rev. B. Wilson being re-elected president, and Mr. Edwin Stoks, secretary.

OVENDEN NATURALISTS’ SOCIETY.—Meeting Sept. 29th, Mr. T. Scott, president, in the chair. Mr. Charles Sheard laid on the table a number of specimens in botany (which were small on account of the lateness of the season); Mr. T. Cockcroft a goodly number of geological specimens, including a splendid Lepidodendron.

STAINLAND NATURALISTS’ SOCIETY.—Monthly meeting at Burwood, August 6th, Mr. Stott in the chair.—The following specimens were exhibited:—By Mr. F. Lumb, king parrot, parroquet, and flycatcher, from Australia; by Mr. B. Garside, a pair of waxbills, dragon-fly, and eggs of black-headed bunting, red linnet, greater whitethroat and bullfinch; by Mr. J. Edwards, a collection of plants.

MONTHLY MEETING, Sept. 3rd, Mr. J. E. Garside, president, in the chair.—Specimens of the guillemot, puffin and young, were exhibited by Mr. B. Garside, shot at Flambro’ by Mr. J. Casson. There was a good table of botanical specimens collected by Messrs. Edwards, Hanson, and Calvert at Castle-carr Moors, near Halifax. As Sir Henry Edwards and party were passing the lower lake adjoining the Castle on Tuesday evening, the 4th instant, a bevy of forty-five wild ducks rose from the water. The party killed fourteen on the spot, and ten others fell wounded into the lake, and were recovered by retrievers the following day, as they were all more or less disabled. They were mostly black scoters, with a yellow patch on the bill; the rest were mallards, and it was thought that there were a few divers amongst those that flew away on the first discharge.

MONTHLY MEETING, Oct. 1st, at Burwood, Mr. Hanson in the chair.—Papers were read on the badger (one having been caught at Ripponden) and other subjects, after which specimens were exhibited—by Mr. B. Garside, barn owl, shot on Greetland Moor; Mr. R. Calvert, *Colias Edusa*; *Narthecium ossifragum*, *Gentiana campestris*, and *G. Pneumonanthe*, and other plants, were laid on the table.—C. C. HANSON.

WEST RIDING GEOLOGICAL AND POLYTECHNIC SOCIETY.—The annual meeting was held in Huddersfield, on 24th October, Col. Thos. Brooke,

J.P., in the chair. The minutes of the last meeting (Ripon) were read by the secretary, Mr. J. W. Davis, F.L.S., F.G.S., after which it was resolved that the Society be called "Yorkshire" in place of "West Riding." Mr. J. T. Atkinson moved, and Mr. G. H. Parke, F.G.S., seconded, that the next meeting be held at Selby. The officers for the ensuing year were then elected, the Marquis of Ripon, K.G., being president, and J. W. Davis, F.G.S., secretary. The following papers were read:—By Mr. G. H. Parke, F.G.S., "On the occurrence of Vermiculite in England." The mineral was first found in England by Mr. C. E. Manley, in the glacial debris in Walney Island, and Mr. Parke had little doubt but it would yet be found amongst some of the decomposed granite boulders in the West Riding. "On Carboniferous *Cephalopoda*," by Mr. Wm. Cash, F.G.S., of Halifax. The paper was the first of a series, and dealt with the structure of the recent *Cephalopoda* only as an introduction. Mr. Cash described the organization of this class of animals, and their classification, with great clearness, and illustrated it with excellent diagrams and some very interesting specimens, amongst which was a rare species of *Spirulida*. "On the unconformability of the Red Rocks of Central Yorkshire with the Permian Limestone," by Mr. J. W. Davis (hon. sec.) The object of the paper was to show that this red rock, which had been somewhat of a puzzle to geologists, was really a member of the carboniferous group, as shown by its unconformability with that member of the Permian series against the escarpment of which it was usually found—as at Bramham, St. Helen's (in Lancashire), and Pontefract. The paper was illustrated by striking diagrams of the strata at these places, and by delineations on the blackboard. The usual votes of thanks concluded a most interesting meeting.

YORK DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting, Oct. 10th, Mr. J. Morgan, M.R.C.S., in the chair.—A resolution having been passed at the last meeting that an Exhibition illustrative of Natural History be held in the Corn Exchange, the secretary reported that the committee had made the necessary arrangements, and hoped the members would assist them to make it a great success. Mr. Posthill exhibited a specimen of *Ennomos Tiliaria*; Mr. Helstrip, a specimen of *Sphinx convolvuli*, taken in the Cemetery grounds; Mr. G. Jackson, a very fine box of *Tortrices*; the secretary, a fine-bred series of *Acidalia contiguria*, *Sesia chrysidiiformis*, *Anticlea sinuata*, and *Eupithecia consignata*, also a specimen of *Colias Edusa*, taken at Stillington, and a fine yellow variety of *Zygæna filipendulæ*, taken at Cambridge.

YORKSHIRE NATURALISTS' UNION.—The sixteenth annual meeting was held at the George Hotel, Wakefield, on Saturday afternoon, the 6th of October. The council met at 3-15, the sections met to elect their officers at 4-30, and tea followed at 5. At 6 p.m. the general meeting was held, the Rev. Wm. Fowler, M.A., president, in the chair. The attendance was about 70; the Societies were all represented, with the

exception of Stainland, Ripponden, Rastrick, Honley, and Sheffield. The Batley Field Naturalists' Society was admitted into the Union. An unusually long list of additional subscribers was read—33 in number,—including the Marquis of Ripon, Lord Walsingham, Mr. L. R. Starkey, M.P., the Rev. F. O. Morris, and others. A vote of thanks was unanimously adopted, moved by Dr. Parsons, and seconded by Mr. T. Lister. The secretary then read the annual report and financial statement, as prepared by the council. The report congratulated the Union on its satisfactory condition, and stated that it at present included 25 societies, with an aggregate of about 1300 members—being an increase of four societies and 250 members. It detailed the various changes which have during the year been introduced into the working of the Union, alluding more particularly to the establishment of sections, the change of name, and the proposed transactions. The balance-sheet showed a balance, paid or promised, of £20 2s. 6d. to the credit of the Union. The report and balance-sheet were adopted, subject to audit, on the motion of Mr. John Conacher, seconded by Mr. Thomas Tate. The Sections then reported the names of their officers, as follows :—Vertebrate Zoology, Mr. E. Hunter, F.C.S., of Goole, president, and Mr. Thomas Lister of Barnsley, secretary ; Conchology, Mr. Wm. Nelson, of Leeds, president, and Mr. Henry Crowther, of Leeds, secretary ; Entomology, Mr. Wm. Prest, of York, president, and Mr. G. T. Porritt, F.L.S., of Huddersfield, secretary ; Botany, Rev. Wm. Fowler, M.A., of Liversedge, president, and Dr. H. Franklin Parsons, of Goole, secretary ; Geology, Mr. Thos. Tate, of Bradford, president, and Mr. James Spencer, of Halifax, secretary. On the motion of Mr. Roebuck, seconded by Mr. J. Spencer, it was resolved to abolish the four vice-presidencies created at the last annual meeting, and to make the past-presidents of the Union and the presidents for the time being of sections, vice-presidents of the Union, with seats on the council ; and also to give a seat on the council to the secretaries of sections. The president then addressed the meeting, stating that in his opinion the year had been a very successful one in all respects. The election of officers then took place. Mr. Henry Clifton Sorby, F.R.S., president R.M.S., was unanimously elected president on the motion of Mr. Hobkirk, seconded by Mr. Porritt. The two secretaries, Mr. Geo. Brook, ter., of Huddersfield, and Mr. Wm. Denison Roebuck, of Leeds, were re-elected. It was resolved that two auditors be appointed, to act both for this year and next, and Mr. A. Crebbin, of Bradford, and Mr. Richardson, of Wakefield, were chosen. The council recommended six places, and one was also proposed in the meeting. On a vote being taken, it was found that the following places had been selected :—Bishops Wood, Brough, Settle, Wentbridge, Wharncliffe, and Ilkley. On the recommendation of the council, Leeds was selected as the place of the annual meeting, to be held later in the year than heretofore. Votes of thanks to the local secretary (Mr. Wm. Talbot), to the president and the secretaries, concluded the business.—W. D. R.

Diary.—Meetings of Societies.

- Nov. 1. Leeds Conchological Club.
" 5. Barnsley Naturalists'. Huddersfield Naturalists'.
" 6. Bishop Auckland Naturalists' Club. Liversedge Naturalists'.
Leeds Naturalists' Field Club.
" 7. Goole Scientific Society—Paper "A Naturalist's first impressions
of the Alps."—H. Franklin Parsons, M.D.
" 8. Leeds Conchological Club. Huddersfield Literary and Scientific
Society—Geological Section.
" 9. Huddersfield Scientific Club.
" 10. Heckmondwike Naturalists'.
" 12. Huddersfield Literary and Scientific Society. Leeds Geological
Association—Paper on "The Silurian Rocks of Yorkshire."—
James W. Davis, F.G.S.
" 13. Leeds Naturalists' Club.
" 14. York and District Naturalists' Field Club.
" 15. Leeds Conchological Club.
" 17. Huddersfield Naturalists'. Batley Naturalists'
" 20. Leeds Naturalists' Field Club.
" 21. Goole Scientific Society—"The History of Goole and its Neigh-
bourhood."—Mr. H. F. Gardiner.
" 22. Leeds Conchological Club. Huddersfield Literary and Scientific
Society—Geological Section. North Staffordshire Naturalists'
Field Club, at Hanley.
" 26. Huddersfield Literary and Scientific Society—Paper: "The Nature
and Habits of the Cuttlefishes."—Herbert Major, M.D., of
Wakefield. Leeds Geological Association—"Remarks on
Igneous Rocks of Edinburgh."—J. K. Blakey, F.G.S.
" 27. Leeds Naturalists' Club—Paper: "How to examine a Plant micro-
scopically."—Henry Pocklington, F.R.M.S.
" 29. Leeds Conchological Club.

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Original Articles.

NOTES ON SOME LINCOLNSHIRE LEPIDOPTERA.

By F. ARNOLD LEES, F.L.S.

As this county is almost unworked entomologically, the following items may not be without interest, and furnish a link in the chain of the comital distribution of some species, for those students who are accumulating the facts, upon a multitude of which generalisation can only be safely ventured upon. As a medical man, up and about almost everywhere, and at all times of the day, my opportunities for observation are manifold, although my chances of collecting for the cabinet are few. The following notes refer exclusively to the district lying within six miles of Market-Rasen as a centre.

I. *The Butterflies*.—To the widespread abundance of *Colias Edusa* this year, this district proves no exception. Up to the date of the Goole gathering I had not observed any of the first, or hybernated brood, I suppose; but within a few days afterwards I noted a single specimen fly past me along a lane near Lissington. Since then it has become somewhat abundant, and within the first week of September I have seen hundreds. Just now *Edusa* is commoner in the lanes on all sides of this town than any other butterfly, except *Satyrus megæra*, which literally swarms. Earlier in the season *Gonepteryx Rhamni* was very plentiful (its food-plant *par excellence*, the purging buckthorn, is everywhere very plentiful), and *Arge Galathea*, by no means rare. Of the Fritillaries I have seen only *Aglaia*, *Selene*, and *Paphia* so far, and none of them commonly. *Leucophasia sinapis* I have seen only twice, when strolling through Kingerby Wood, five miles from here. *S. Semele* I noted in some plenty on the chalk-wold near Thoresway, during a ramble with the Rev. W. Fowler in July; I have not seen it nearer than that. Of the blues, *Alexis*, *Agestis*, and one *Ægon* on Linwood Warren, are all I have noticed. Of the Hesperidæ, both *Sylvanus* and *Linea* are not uncommon, though apparently local. Of the Vanessidæ, *C. cardui* was plentiful earlier on, and just now *Atalanta* and *Io* are frequently to be seen. *V. urticæ* is frequent; and on the 15th September, after a long chase, I captured a magnificent *V. polychloros* with my hat. These, with the three commoner "whites," *Thecla rubi* (scarce), and the ubiquitous *Janira*, *Tithonus*, *C. pamphilus* upon the heathy ground, and *C. phlæas* in boggy places, complete the list, so far as I yet know, of the Rhopalocera around Rasen.

II. *The Nocturni*.—Of these I have seen but few. *Z. Lonicerae* occurs in some plenty in one spot—an old sandpit on the Legsby-road, but I have seen it nowhere else. *Z. filipendulae* has been common enough in many places. One specimen of *S. ocellatus* I found at rest in a garden arbour early in July; *S. populi* I have seen in the young larval stage lately. *Macroglossa stellatarum* I have noticed once at early morn in a garden at Tealby. *T. tipuliforme* I have once seen; it was at rest upon the counterpane of a bed in which lay a patient, who declared on seeing it that he had been stung by it (or something else!) an hour before: and yet in most respects he is an educated intelligent man!

Nola cristulalis is commonly to be seen at rest on tree boles in the fir woods; *E. Jacobae* in the larval stage swarms upon the sandy warrens, upon the ragwort. *Bombyx Neustria* and *Liparis auriflava* have been abundant as caterpillars upon the thorn hedges; and *C. potatoria* in the wetter parts of the woods about here.

III. *The Geometræ*.—I have not had time to capture and note down the names of many of this class. *V. maculata* I noticed a few examples of, in Legsby Woods, earlier on. *B. abietaria* and *T. crepuscularia* I have seen on tree trunks in the fir woods a few times, and at rest in similar situations or flying over the heathy “openings” of Willingham and Usselby Woods, *P. cytisaria* has been plentiful. Its larva feeds upon the petty whin (*Genista anglica*), which is very plentiful on the warrens and heaths; whilst its more general food-plant, the broom, is a rare species in the district. Of *E. fasciaria* I have seen only one specimen, a magnificent fellow, at rest upon a fir-tree bole in Willingham Wood. In the woods upon the way between Rasen and Usselby, *M. liturata* was very common about six weeks ago, but of *F. piniaria*, which I expected to find there in May, I could see nothing. *F. atomaria*, of the small northern type, is abundant upon the heaths. Of the pugs I have only observed *E. nanata*, *E. minutata* and *E. rectangulata*. The large-leaved Burnet-Saxifrage (*Pimpinella magna*) is exceedingly abundant all around Rasen, but nevertheless I have failed to find any trace of *E. pimpinellata*; perhaps, however, this may be because I do not know how to look for it. A few other of the very commonest Geometræ, such as *C. bilineata*, complete my list for this class.

IV. *Pseudo-Bombyces*.—*D. cœruleocephala*, *D. furcula*, and *N. zigzag* are all I have so far noticed about Rasen, and of these only single specimens. A few days ago I had a few *P. bucephala* larvæ, which I found feeding upon apple-trees in my garden. Sallows, willows, and

poplars of small growth are, however, so extremely abundant upon the borders of our warrens and streams, the leayes showing signs of larvæ, that I intend soon to have a night at beating ; the results I shall send away to feed—my only object in collecting being to ascertain what occurs, and what does not.

V. *Noctuæ*.—In this class my list for Rasen must be a short one, as I have “sugared” very little. *C. duplaris* occurs in Legsby Woods ; *A. megacephala* is moderately common about poplars on the Linwood-road. There are many pools, ponds, and wet places about Rasen with an abundance of *Typhæ*—(*latifolia* and *angustifolia*), so there is no scarcity of the Leucanidæ. *L. lithargyria*, *L. pudorina*, *L. commæ*, *L. pallens*, *L. impura*, *N. typhæ*, are all frequent ; *T. fulva* swarms in a wet hollow on the road to Legsby, amongst tussocks of *Carex paniculata*. I did not know this until a few days ago, when the imagos appeared in profusion ; but now that I find it so plentiful and confined to one spot, where the vegetation is of one kind only, I shall endeavour to obtain the larvæ or pupæ next year. *M. arcuosa* is common in marshy spots at Willingham ; *H. nictitans* abundant upon the thistles and ragwort on Osgoldby Common ; *C. graminis* has appeared during the last fortnight plentifully ; *L. cespitis* I noted in August on Linwood Warren, flying over the heather ; *M. literosa*, one specimen on a paling at rest in July ; *A. suffusa* at sugar in my garden ; *A. tritici* common on Osgoldby Warren ; *A. agathina* occurs in the heathy openings of Usselby Woods and Osgoldby Warren, in the larval state. I took a few larvæ in June, but failed to rear them, and I have not succeeded in finding the imago by light, late at night, at rest on the heather, as years ago I have done on Adel Black Moor near Leeds. I do not doubt I could yet, but working alone at dead of night and into the small hours of the morning, without any companion save a pipe and a pouchful of “Three Castles” Virginia, is not such inspiriting pleasant work that one feels inclined often to repeat it. (This town has not, as yet, given birth to an entomologist : I am an importation.) *A. porphyrea* is plentiful enough in the same situations as the insect just mentioned.

Of the Tryphænæ I have seen only that nuisance *Pronuba*. *Noctua C. nigrum* seems to be commoner here than I ever found it in Yorkshire or Durham ; I have found as many as a dozen come to sugar in one evening, whereas my former experience has been an odd one now and then, at no particular time or place. *T. piniperda* : one at rest in Willingham Wood, much worn, in May, but doubtless I came here too late for it. I have, now that I know it occurs, no doubt that the

extensive fir-woods of the greensand around Rasen will yield it as abundantly next April as a month later they yield *Pyrola minor*. The Tæniocampæ I have not worked for this season. Of the Xanthidæ I have already seen *X. cerago*, *X. silago*, *X. gilvago*, and *X. ferruginea*. A large wood upon the oolitic gravels five miles west of Rasen, known as Kingerby Wood, will probably well repay working. I have already mentioned two good insects that occur there; to this I have to add a third—*E. fulvago*! Of this rare insect I espied a specimen upon a tree-bole near the ground, whilst walking through the broad ride about a month ago.

About six weeks to two months ago, I was hunting about amongst some rank grassy herbage not above a quarter of a mile from the town, when I came across the larvæ of *Eremobia ochroleuca*. They were feeding upon *Scrophularia nodosa* (Figwort). Last week, passing the same spot, I saw an imago clinging to a grass-stem—confirming my determination of the larvæ, which I did not attempt to rear. This species I never saw alive before, and Lincolnshire, is, I believe, a new county for it. Familiar as I was with the habits of the *Dianthæcias* in Durham, I have not observed one here, perhaps because the campions and catchfly are very sparingly distributed about this place. Some larvæ of *Polia flavocincta* occurred to me in July, feeding on water ragwort (*Senecio aquatica*), but I have not yet seen the perfect insect. *A. nebulosa*, Kingerby Wood; again a specimen, at rest, in July.

Of the Hadenidæ I have so far seen few; *H. dentina*, *oleracea*, and *pisi* complete the list. Of the “sharks,” two species are common hereabouts I find; *C. verbasci* I observed in the larval state, feeding on *Scrophularia aquatica* and *nodosus* in the same place as *E. ochroleuca* and *C. umbratica* I have seen at petunias in a garden.

I now come to mention the last insect of any note I have seen here this season, and one I never saw alive before—*Erastria fuscula*. It was very plentiful in Usselby Woods in July, flying about one at every step, chiefly amongst the heath and bramble undergrowth; but scores were to be seen at rest upon the fir and birch tree trunks. I thought it quite a southern insect, but then truly Lincolnshire is an unworked county. I have no doubt from what I have seen in this my first season here, that were Mr. Porritt to spend a month with me next season, that many quite unexpected rarities would turn up.

Plusia festucæ and *E. glyphica* end my list of the Noctuæ for this year.

I know little of the habits of the Deltoides and Pyrales. *P. purpurealis* has been rather common in spots ; and over one little pool, full of pondweed and *Lemna polyrhiza*, at Bleasby Four-Lane-Ends, early in July, I found on the wing, all at one time, *Cataclysta lemnalis*, *Hydrocampus nymphœata*, *H. stagnalis*, *Accentropus niveus*, and *P. stratiotatis*. As I know the larvæ must be abundant at the proper season, I mean to have a regular “fishing” excursion.

Market Rasen,
Sept. 16th, 1877.

HINTS ON NATURAL HISTORY COLLECTING.

BY H. F. PARSONS, M.D.

(Read before the Selby Naturalists' Society, Oct. 18th, 1877.

IN the scientific work done by the members of a local Naturalists' Society like those of which the Yorkshire Naturalists' Union is composed, the collecting of objects in the various branches of Natural History occupies a prominent place ; I have thought, therefore, that it might not be amiss to lay before you a few thoughts upon the principles which should guide us in our collecting, so that the results which we obtain may have a real scientific value. There are those who doubt the utility, in a scientific point of view, of amateur collecting ; for instance, our friend Mr. Miall, in a letter to *Nature* a few weeks ago, on the subject of “Public Museums,” says that a local museum will have taught the working man a very undesirable lesson if it teaches him to go and make a collection on the small scale similar to that which he there sees. Mr. Miall considers that we have had enough, and more than enough, of unintelligent collecting, and that to know a few animals and plants thoroughly is better than to be able to recognise a large number of species. With all deference to Mr. Miall, I propose to show that if our collecting be too often devoid of scientific value, it is because it is so often “unintelligent collecting,” the amassing of a collection being looked upon as an end in itself, rather than (as it should be) merely the means to an end---that end being the knowledge of the objects collected. In one sense, indeed, it may be said that collecting is an essential preliminary to the study of plants, animals or minerals. We are told, on the high authority of Mrs. Glasse, that it is necessary to get our hare before we can cook

it; and, similarly, before we can study natural productions we must procure specimens to study, for I need hardly say that no satisfactory knowledge of them can be attained by reading alone: we must have the objects themselves to see and handle. Beyond this, however, I maintain that the making of collections may be made not only a pleasant recreation, but a mental discipline, and a means of advancing the sum of human knowledge. Were it merely a recreation, the collecting of specimens of natural history would deserve encouragement as an innocent and healthful pastime. Some of the happiest hours of my life have been spent in hunting after plants and fossils, and a taste for such simple pleasures which leave no sting behind them, is in itself a source of happiness by no means to be despised. Compare the amount of pleasure which a holiday trip affords to the man who sees something to interest him at every turn, and to the man who has no object but to kill the time. It does not affect the naturalist that most of the well-thumbed novels which compose the scanty stock of the seaside circulating library have lost one or more volumes out of the three; he has resources within himself, and the treasures which he obtains from pleasant mementos of the places he visits, which, when he looks over his cabinets in years to come, will call back delightful recollections of days gone by.

I think it will be found that to set any one to work to make a collection, is the most likely way to get him to take such an interest in the objects he collects as will induce him to study them more deeply. Acquisitiveness—the desire to be able to call a thing our own—is one of the strongest propensities of human nature, not less so in Yorkshire than elsewhere,—and, in its proper place, is a very useful one; moreover, one can hardly make a collection and name the specimens, without learning at least something about their structure and habits. There is a difference, however, in this respect between different classes of objects: for instance, a man might make a large cabinet of butterflies or shells, and yet know very little about the animals whose outer covering he preserves, but he will not do very much with diptera, or with mosses, or algæ, without careful microscopic study. To puzzle out for one's-self, by the help of a synopsis, the name of an unfamiliar plant or animal is capital practice in the use of terms, and an excellent means to show to us the value of a scientific classification and nomenclature. Mr. J. S. Mill speaks of the advantage which he derived from a knowledge of botany, in teaching him to form mental habits of accurate classification. On the great question, now so keenly debated, of the nature and origin of species, the

botanist who has collected roses or brambles, or the conchologist who has tried to name a *Pisidium* or a *Littorina*, will be far better able to form a sound opinion than those who are acquainted merely with a limited number of well-characterised kinds. In naming specimens belonging to variable groups such as those I have named above, it is of great value to have for reference a permanent collection of authentically named specimens. The species of such groups are very hard to define in words, indeed the so-called species are only strongly marked types between which there is a perfect series of intermediate forms, although most of the individuals approach more or less closely to one or other type. The humblest collector may, if he sets to work in the right way, do real work for the advancement of science by accumulating materials and observations for abler hands to make use of. The part of the labourer who carries the bricks for the erection of a house, is a humbler one than that of the mason who builds them up, still more so than that of the architect who combines the several parts of the edifice into one harmonious whole, but it is none the less necessary. To know what species compose the total assemblage of plants and animals—the “flora” and “fauna,” as they are termed—of a region, is of much value, as we may not only learn from it the laws which govern the distribution of species, but may often draw very interesting deductions as to the past history of our globe. Thus, from the close resemblance between the flora and fauna of England and of the adjacent parts of the continent we may confidently infer that it is only lately, geologically speaking, that our island has become detached. This knowledge of the flora and fauna of a district can only be obtained by assiduous collecting, and if the district be a large one, only by the co-operation of many workers.

In geology, a complete knowledge of the fossil flora and fauna of a particular bed is of still greater importance, since it may be the only means by which the relative age of that bed can be determined. The compilation of lists of the animals, plants, and fossils of a given neighbourhood, is a work which can be done far better by local observers than by any one else, since they are not only more intimately acquainted with every part of the district than an outsider can be, but are on the spot all the year round. Species which appear early in the season would, in all probability escape the notice of a visitor in August. With fossils, too, the local man has by far the best chance; he can choose for his visit to the spoil heap, quarry, or clay-pit, just the right time when a large quantity of material has been got out and

washed clean by a heavy shower, and will find an abundant harvest ; while the man from a distance may find everything cleared away or filled in, and, unless very fortunate, may have to pay several visits before he happens to hit a favourable time.

How, then, should we set about our collecting so as to obtain useful results ? To do this we must remember that, as I said before, the end of our collecting should be the study of the animals, plants, fossils, or minerals which we collect. Now these objects may be studied from various points of view ; we may study their intrinsic characters, or we may concern ourselves with the circumstances under which they occur—their distribution in space and time. Suppose that we wish to study the characteristics of a plant or animal, it is of great importance that our specimen should be a perfect, typical, and well-developed one, and if we mean it for preservation, it should be as far as possible a complete illustration of the species, or if this be impracticable, we should have a series of specimens so as to give a representation of every part. Thus, in drying a plant for our herbarium, we should, if possible, choose a specimen which shows root, stem, leaves, flowers, and fruit, so that we can see the whole of the plant at a glance ; of course, however, this cannot be done in the case of very large plants, such as trees. An exception should also be made where a plant occurs in but small quantity, as by digging up the root we might run the risk of exterminating it. Of dioicous plants, both sexes should be shown. Inexperienced botanists very often ignore this golden rule, and, with a view to making their specimen look neat as if for a nosegay, cut off the root and lower leaves, and the flowers that may have run to seed ; yet upon these parts essential characters often depend. In the case of animals and fossils we should not rest content with anything short of a typical and perfectly preserved specimen, if such can be obtained. With fossils this is very often not the case, and we have to content ourselves with such fragments as we can get ; but even then we may be able, by a series of specimens—one showing one point, and another another, to give a much more complete representation of the whole than could be obtained by a single specimen. Still we must not be too particular, or we shall miss a great deal. The best plan is, if we find something that we have not got before, to keep the specimen, even if it be not a perfect one, until we find a better. If we pass it by, we may not find another.

Another point of great importance is, that our specimens be named. Any observations we may make will be of little or no value unless

we know to what species they refer. It is necessary, however, to impress upon beginners the need for great care and caution in naming their specimens. It is better to give half a name, or none, rather than a wrong one. Specimens are named by comparing them either with the description in a handbook or with figures, or typical specimens. Beginners often slur over the minuter and less accessible characters, as for instance of the seed ; this is a mistake, for attention to these costs less trouble than they imagined, and will often help to decide a knotty point.

If, instead of the grosser characters—the “morphology”—we wish to investigate the microscopic structure—the “histology” of an organism, it is of course not necessary that our specimen should be an entire one, but it is none the less important that it should be well developed and well preserved, and that we should know the name.

It may be that our object in collecting specimens is not so much to study the characters of the kinds themselves as to ascertain the conditions of time and place under which they occur.

Although it is always desirable to secure good specimens if possible, it is not essential to do so when our object is merely to prove the occurrence of a species in a particular place; a mere fragment, if recognisable, will be sufficient for our purpose. A single leaf of the holly in a herbarium, from an unknown district, would suffice to prove the occurrence of that tree, and from a few battered fragments of *Sigillaria*, *Ammonites*, and *Belemnites*, intrinsically valueless, the age of whole mountain masses in the Alps has been determined. When investigating the distribution of species, it is necessary to record not merely the place and the date at which the specimen was obtained (which should always be done in every collection), but also certain other particulars, varying somewhat in the different sciences. For instance : in geology it is of the first importance that the stratum from which each fossil is obtained should be accurately recorded, both in order to ascertain the range in time of that particular fossil, and also on the other hand to determine the position, in the geological series, of the rock in which it is found. For the want of systematic records of this kind, the collections of beginners in geology are often a mere mass of rubbish. One sees jumbled together in picturesque confusion, in a drawer or box, coal-plants, liassic, oolitic, and cretaceous *Ammonites* and *Belemnites*; eocene and crag univalves; silurian, devonian, and carboniferous corals; sea urchins from the oolite and chalk; or brachiopods and bivalves from various primary and secondary formations—all without names, geologic formation, or locality, and many

so worn or imperfect as to be unrecognisable. What could possibly be learnt from such a collection as this? To the geologist it could teach nothing, and a person ignorant of geology could only learn that stones of curious shapes were sometimes found, from the shape of some of which he might perhaps infer that they were the remains of animals or plants. How different if the specimens were all systematically arranged and labelled!

(*To be continued.*)

Rainfall for October.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL. TO DATE.		Date of heaviest Fall.	Amount of heaviest fall.
				1877.	1876.		
Huddersfield (Dalton)..... (J. W. Robson.)	350	3·91	20	34·27	*26·63	23rd	0·78
Wakefield	120	3·00	17	...	...	23rd	0·67
Leeds ... (H. Crowther.) ...	183	3·16	18	29·51	21·97	28th	0·60
Halifax	360	6·95	18	48·85	37·43	21st	...
Barnsley .....(T. Lister.) ...	350	2·53	18	30·90	...	23rd	0·80
Ingbirchworth ... (Do.).....	853	3·92	17	...	...	23rd	0·70
Wentworth Castle (Do.).....	600	3·22	13	...	...	23rd	0·82
Goole... (H. F. Parsons.) ...	25	1·49	16	23·19	18·77	27th	0·18+

* This is the average to date for 11 years, 1866-76.

† Same fall on 29th.

Short Notes and Queries.

THE LAUGHING GULL.—I thank Mr. S. L. Mosley for calling my attention to the above having been observed at Riccall Common. It was *Larus ridibundus*, which in this district is called the laughing gull, and not *L. atricilla* as was incorrectly reported.—W. N. CHEESMAN, Selby.

LATE STAY OF THE SWALLOW.—I noticed a swallow, evidently enjoying a fly hunt over the canal here, on the 29th and 30th October. The main body I think departed some time before.—GEO. T. PORRITT, Huddersfield, Nov. 8th.

Sphinx convolvuli NEAR BRADFORD.—During the month of September last, a specimen of *S. convolvuli* was captured, at rest on a tree, by a boy at Heaton, near Bradford. It was placed under a tumbler, where it lived for more than a week, and, considering this, is in very fair condition. It is now in my collection.—J. W. CARTER, Manningham, Bradford, Nov. 16th.

Reports of Societies.

BARNESLEY NATURALISTS' SOCIETY.—Meeting Nov. 5th, the president, Mr. T. Lister, in the chair.—A few lepidopterous insects were shewn by Mr. J. Harrison, secretary, and a few remaining wild flowers, ferns, &c. Of summer migrants, the last noted were chiffchaff Oct. 2, sand martin 6th, house martin 12th, swallow, 17th near Doncaster, 21st near Wakefield; they have been delayed by late broods and storms. Of winter migrants, redwings Oct. 3, jack-snipe 4th, fieldfare 11th, woodcock 13th, brambling or mountain-finch from the moors, 28th, grey wagtail from the N.W. hills, 21st.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting Nov. 14th, the president in the chair.—Mr. B. Illingworth gave a lecture on astronomy. The president reported the following insects as having been taken during the past fortnight:—*H. defoliaria*, *H. aurantiaria*, *C. boreata*, &c. Mr. J. W. Carter exhibited a fine specimen of *S. convolvuli*.—H. T. S.

BRIGHTON AND SUSSEX NATURAL HISTORY SOCIETY.—At the last meeting of this Society Mr. H. Goss, F.L.S., &c., gave the third and concluding paper on "The Insect Fauna of the different Geological Periods," taking on this occasion "The Paleozoic Periods." The insect remains in these periods are necessarily rare, none being found in England except in the coal measures, but in Europe and America they were more frequent, especially in the coal measures, and some had been found in the Permians of Saxony, and the Devonian of New Brunswick. The few British remains were a beetle and locust from Colebrook-dale, three *Orthoptera* from near Sunderland, and one from the Scotch coalfields. Amongst foreign specimens, one of the insects described by Dr. Dohrn, from the Permian of Saxony, belonged to an extinct order, which combined some of the characteristics of the *Neuroptera* and *Hemiptera*, and was probably descended from a common ancestor of both these orders. In the Belgian coalfields another insect had been found belonging to the extinct order *Paleodictyoptera*, and another was referred to the *Lepidoptera* by Dr. Breyer; Mr. McLachlan, however, pronounced it as *Neuropterous* belonging to the *Ephemerina*, and the lecturer was of opinion that this decision was probably right, indeed the *Lepidoptera*, being the highest development of insects, was the last to appear on the geologic horizon, and that it was very improbable that any of them would occur in the coal measures. All the American insects were either *Neuroptera* or *Orthoptera*. Altogether the Paleozoic rocks had yielded about 100 speci-

mens and 95 species, of which 5 were British, 65 European, and 25 American, and they included 3 *Coleoptera*, 3 *Hemiptera*, 51 *Orthoptera*, 24 *Neuroptera*, and 14 of the extinct order *Paleodictyoptera*. The lecture was concluded by a summary of the results of the three papers, thus giving a *résumé* of the known fossil insects.

GOOLE SCIENTIFIC SOCIETY.—31st Meeting, Nov. 7th, Mr. Hunter, F.C.S., president, in the chair.—A paper was read by Dr. Parsons, entitled “A Naturalist’s first impressions of the Alps.” The author, after alluding to the geographical position of the Alps, described their scenery, and the four zones into which the surface might be divided, viz. those (1) of cultivation, (2) of pine forests, (3) of alpine pastures, and (4) of perpetual snow. He then explained how it was that in ascending mountains we found the temperature to fall. Above the line where the mean annual temperature was 32° Fah. snow was present all the year round. The removal of snow was effected (1) by evaporation, (2) by melting, (3) by avalanches, and (4) by glaciers. He then described glaciers, their mode of formation, appearances, movement, termination, and effects as transporting and abrading agents; also moraines and other recent glacial deposits, comparing them with the glacial beds of England. The geologic structure of the Alps was briefly described, with their centres of crystalline rocks flanked by masses of altered secondary strata, all remarkably contorted, and the remarkable difference in form exhibited by the Alps and the Jura, corresponding to their difference in geologic structure, was alluded to and compared with similar contrasts between different ranges in this country, as the Cotswolds and Malvern. Cascades, and their appearances and effects upon the rocks were described, and an account given of an Alpine ascent. The author then gave a summary of the observations which he had been able to make in zoology and botany, mentioning the great abundance and variety of insects, many kinds being plentiful which in this country are very scarce. The same thing was noticed as regards the flora, which, though on the whole resembling that of Great Britain, was richer, exhibiting together species which in this country were found respectively in the south, the east, and the north, containing also many additional species, the latter however, with very few exceptions, belonging to orders, and for the most part to genera, which had representatives in Britain. The characteristics of the flora of the four zones were alluded to, as also the influence of situation and aspect upon vegetation. Cryptogams were noted as being remarkably abundant, luxuriant, and fertile. A number of specimens were exhibited in illustration of the paper, comprising dried flowering plants, lichens, &c., insects, geological specimens, and photographs of scenery. An ice-marked boulder from the Gorner glacier was exhibited side by side with one from the boulder clay at Escrick, and the similarity between them was such as to leave no room for doubt that they had been shaped by the same agent.

—H. FRANKLIN PARSONS.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting November 8th, Mr. C. P. Hobkirk, president, in the chair.—Mr. S. D. Bairstow showed various lepidoptera recently taken by himself at Llanrwst, including *Colias Edusa*, var. *Helice*, singularly the only specimen of *Colias* he had observed there: it appeared to be just out of pupa; the spotted variety of *Satyrus Hyperanthus*, *S. Ægeria*, *Xylina rhizolitha*, &c. Mr. G. T. Porritt exhibited *Meliana flammea*, taken in the fens during the past season by Mr. F. D. Wheeler; *Crambus hamellus* and *latistriellus*, from Surrey; *C. uliginosellus* and *Schœnobius gigantellus*, from Norfolk; and *S. forficellus*, from near London; the secretary (Mr. George Brook) a large case of named exotic Diurni; and Mr. S. L. Mosley, a fine series of coloured plates, executed by himself, most of them being of exotic *Rhophalocera*, but some were of British *Nocturni*; one in particular of the whole of the British *Zygænidæ* created great interest.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meeting Oct. 29th, Mr. S. J. Capper, president, in the chair.—A paper was read by Mr. Ellis, entitled, “On the Preservation of Lepidopterous Larvæ.” The meeting then resolved itself into a conversazione, and the members exhibited several objects of interest. A very fine specimen of *Acherontia Atropos* was shown by Mr. West. It was caught on board a vessel twenty-five miles from Holyhead.—W. H. MOUNTFIELD, Hon. Sec.

LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—268th Meeting, October 30th, the president Mr. Jas. Abbott, in the chair.—Paper read, “The Potato,” by Mr. C. S. Spence.

269TH MEETING, Nov. 6th.—A number of donations of eggs, butterflies and beetles to the local collections were shown. Mr. John W. Taylor showed *Helix villosa*, *H. incarnata*, *H. candidula*, *H. rupestris*, *Clausilia pumila*, *C. laminata*, *Pomatias maculatum*, and *Bulimus montanus* from Neuchatel, in Switzerland. Mr. Henry Pollard showed two tablets of *Helix ericetorum* from Settrington, near Malton; in one of the specimens the spire was very much raised. Mr. Hy. Crowther exhibited specimens of a wood-boring beetle (*Hylesinus vittatus*), and of bark infested by it, taken near Leeds. Mr. Roebuck exhibited *Sirex gigas* (female), and another species of *Sirex* which he had not identified, from Crewe; and also a species of the same genus taken alive in Leeds, which he considered as likely to prove to be the *Sirex melanocerus* of Thomson's “*Hymenoptera Scandinaviæ*,” vol. i. Mr. Charles Smethurst showed a number of beetles taken at Bishop's Wood, among which Mr. H. Crowther identified *Steropus madidus*, Fab., *Apoderus coryli*, L., *Micraspis 12-punctata*, L., *Coccinella bipunctata*, L., and *C. 14-guttata*, L.

270TH MEETING, Nov. 13th, the president in the chair.—The president exhibited a living animal of *Planorbis nautilus* under the microscope, showing the movements of the heart and the ciliary motions. With the microscope Mr. F. Emsley showed the raphides of Black Bryony (*Tamus*

communis). Mr. C. Smethurst showed dipterous insects, unnamed, and Mr. F. Greenwood a living salamander from Switzerland, pointing out the salient points of difference between the newts and salamanders.—WM. DENISON ROEBUCK, Sec.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting, 10th November, Mr. T. Scott, president, in the chair. *Sirex gigas* was exhibited, caught by Mr. S. Hirst at Holmfield, the third during this season. Mr. T. Hirst exhibited the following birds:—Pair of long-eared owls, wood owl, three pairs of ptarmigans—one in winter, one in summer, and one in autumn plumage; swallow, from the Cape of Good Hope; pair of plovers and one silver plover. In geology, Mr. T. Cockcroft exhibited a large number of fossil plants and shells, also *Lepidostrobus*, *Cyclopterus*, *Calamites*, *Hallonia*, and one of the most beautiful specimens of *Lepidodendron* in sandstone ever shewn. The specimens were named by Mr. Jas. Spencer, who also presented to the Society a set of glacial boulders, from the valley of the Calder, including Ennerdale granite, Scotch or Dalbeith granite, St. John's Vale syenite (three very characteristic rocks), boulder of encrinital limestone, which he had found at a height of 1,150 feet on the hills near Hebden Bridge. He also explained the difference between syenite and granite, and showed a piece of syenite from Mount Sinai, the original rock which gave the name of syenite to this particular kind of granite. The specimen is a present from Mr. Wainwright, of Wakefield, who brought it from Mount Sinai last winter.

STAINLAND NATURALISTS' SOCIETY.—Monthly meeting, 5th Nov., at Burrwood.—Mr. Faikes showed male and female cocoons of the emperor moth, from Greetland Moor. Mr. Hanson gave the arrival of the winter migrants—redwing Oct. 10th, fieldfare 21st. Rooks in this neighbourhood, deceived by the spring-like weather, are repairing their nests.—W. H. STOTT, Sec.

WAKEFIELD NATURALISTS' SOCIETY.—Mr. G. Campbell, V.P., in the chair.—Mr. Marson exhibited *L. quercifolia*, the first that has been taken in the district. Mr. Wilcock, *Arion hortensis*, with models of the same, and model of *Balea perversa*. Mr. Wrigglesworth, several specimens of coleoptera. Mr. J. Fogg was appointed delegate to the Yorkshire Naturalists' Union.—J. SPURLING, Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting, Nov. 14th, Mr. T. L. Smith in the chair.—Mr. T. Humphries was elected a delegate to the Yorkshire Naturalists' Union. Mr. Wm. Simmons exhibited a fine bred series of *Rhodophœa formosella*. Mr. Jackson, *Polyommatus dispar*, *Deilephila euphorbiæ*, and *galii* and *Chærocampa celerio*. Mr. Helstrip, a fine example of the hobby, *Falco subbuteo*, shot near York. The secretary (Mr. Prest), specimens of *Myelois ceratoniæ*, recently re-discovered in this country; three fine specimens of *Colias Edusa* (var. *Helice*), taken near London this year; and a fine series of *Acidalia promutata*, *Aventia flexula*, and *Botys lancealis*.

CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.—The list of "Yorkshire Locality Records" of this Society has now increased to 683. Amongst the papers read before the Club we may notice the following:—One by Mr. Henry Pollard on the *Solenidae*, which, although not of that technical character which distinguishes the papers usually read before the Society, was thoroughly exhaustive, describing their geographical distribution and uses as food, &c. Mr. Roebuck, having had occasion to spend his holidays in North Wales, exhibited on his return the shells gathered by him whilst so doing, and read a paper thereon. There was much that was interesting, the peculiar conical shape assumed by the specimens of *Helix aspersa*, and the prominence of a pale central band around those of *H. nemoralis* not being least so. *H. hortensis* did not occur. The whole collection numbered 27 species and varieties; of these 24 were land and three fresh-water specimens, amongst which were *H. concinna* and *Cochlicopa lubrica*, var. *hyalina*. The president (Mr. Wm. Nelson) exhibited under the microscope the lingual ribbons of *Littorina litorea*, *L. obtusata*, *Trochus umbilicatus*, and *Patella vulgata*, extracted from specimens brought by Mr. Roebuck from Llandudno. Mr. H. Nelson read a paper on *Limax agrestis*, living specimens of which were exhibited. Amongst other interesting facts elicited were, its indifference to water, and its quick growth, arriving at maturity in about eighty days. Mr. Henry Crowther read a paper entitled "Holiday Notes," in which he detailed the striking incidents of his recent vacation, whilst hunting for shells in the neighbourhoods of Staleybridge, Miller's Dale, Derbyshire, and Tadcaster. Of the 43 species and varieties gathered, the most striking was *Helix hortensis* with an umbilicus, for which he proposes to institute a new variety, answering to the following definition:—*H. hortensis*, var. *umbilicata*: shell possessing a distinct and open umbilicus. Many specimens of the var. *hybrida* were exhibited, one showing the blending of the white and pink on one lip. Amongst other noticeable exhibits were collections of fossil shells from the Eocene, Greensand, &c., collected by Mr. T. W. Bell; of recent shells of the district around Settrington, near Malton, collected by Miss S. J. Pollard, of Leeds; of the district around Tadcaster, collected by Mast. Hy. A. Crowther; also of Australian shells by Mr. J. W. Taylor.—On the 1st November was held the first anniversary, when the members took occasion to alter the title from "Leeds Conchological Club" to the above, assuming that national character which, as the first club or society of the kind thoroughly established in this country, the members have a claim to. Its objects are—the promotion of conchological science, the acquisition of a library, of a collection of shells, and the publication of proceedings. The subscription is to be 10s. 6d. per annum. The following officers were elected:—President, Mr. W. Nelson; vice-president, Mr. J. W. Taylor; treasurer, Mr. W. Denison Roebuck; hon. secretary, Hy. Crowther, and a committee of seven members.—On Nov. 15th, Mr. J. W. Taylor read a short paper on the species composing the sub-genus *Arionta*, in which with great care were specified not only

their external forms, textures, colours, and markings, but the distinct differences between the lingual dentition and the ribs on the jaws of each. By means of these the reader was enabled to divide the *Ariontae* into seven natural divisions.—HENRY CROWTHER, Hon. Sec.

YORKSHIRE NATURALISTS' UNION.—A meeting of the council of delegates was held at the Leeds Mechanics' Institution, on the 17th of November. The chair was occupied by the new president, Mr. Henry Clifton Sorby, F.R.S., and there were also present eleven officers and sixteen delegates. The dates, places, and local secretaries for the meetings in 1878 were arranged as follows :—Easter Monday, April 21st, Wentbridge, Mr. Wm. Nelson ; Saturday, May 25th, Ilkley, Mr. B. Illingworth ; Whit Monday, June 10th, Brough, Dr. Parsons ; Saturday, July 13th (date fixed provisionally), Settle, Mr. Thomas Tate ; Monday, August 5th, Bishop's Wood, Mr. Wm. Prest ; Saturday, Sept. 14th, Wharncliffe, the local secretary to be appointed by the Sheffield Naturalists' Club. It was resolved that the date of the annual meeting at Leeds should be left open, and fixed when judged convenient. The Map Committee brought forward their report—“That the map be on the scale of four miles to an inch, and that a transfer from Smith's map, as supplied by Mr. E. Stanford, be taken. That the following points be shown, viz :—1. By dotted lines, the five vice-counties of Mr. H. C. Watson. 2. By contour lines, the zones of altitude, one line to be drawn at 900 feet and another at 1800 feet, the surface below the first line to be left blank, that between the first and second to be marked by oblique hatching, that above the second line to be hatched in the contrary direction. 3. By dotted lines, the watershed between the chief river basins. 4. By colour washes the following strata :—(1) tertiary, (2) chalk, (3) oolites, (4) lias, (5) trias, (6) magnesian limestone, (7) coal measures, (8) millstone grit, (9) Yoredale rocks, (10) scar limestone, (11) silurian, and (12) basalt.” These recommendations were adopted, and the Map Committee was re-appointed, with power to add to their number. It was resolved that the publication of the map for the present be deferred, until the finances of the Union are sufficient to warrant the carrying out of the recommendations. It was then resolved that instead of the transactions of the Union being issued in one continuous series, the transactions of the different sections should be kept separate. It was then ordered that the reports of the sections should, when ready, be forthwith printed. Mr. Kell, of Barnsley, introduced the subject of the desirability of an exhibition of natural history objects and scientific apparatus during the next year, suggesting that it be held in Leeds during the week of the annual meeting of the Union. It was resolved that the subject be brought before the first general meeting of the Union. Afterwards, Mr. Fogg, of Wakefield, mentioned the proposed establishment of a museum in Wakefield, with a view to obtaining the assistance of the members of the Union at large.—WM. DENISON ROEBUCK.

Diary.—Meetings of Societies.

- Dec. 1. Huddersfield Naturalists'—Annual Meeting.
,, 3. Leeds Geological Association—"On some points of parallelism between Ontogeny and Phylogeny, especially in their bearing on the Descent of Man."—H. A. Allbutt, M.D.
,, 4. Bishop Auckland Naturalists' Club. Liversedge Naturalists'. Leeds Naturalists' Club, &c.
,, 5. Bradford Scientific Association—Paper by W. West. Goole Scientific Society—"Insects injurious to crops."—E. Hunter, F.C.S.
,, 6. Huddersfield Literary and Scientific Society—Geological Section. "The Early Tertiary Epoch."
,, 8. Huddersfield Scientific Club—Annual Meeting. Heckmondwike Naturalists'.
,, 10. Huddersfield Literary and Scientific Society.
,, 11. Leeds Naturalists' Club, &c.
,, 12. York and District Naturalists' Field Club.
,, 13. Bradford Scientific Association—Paper by J. W. Walker, C.E.
,, 15. Batley Naturalists' Society.
,, 17. Leeds Geological Association—"Notes on well-borings, through the Chalk and Green Sand in the neighbourhood of London."—Benjamin Holgate.
,, 19. Goole Scientific Society.
,, 20. Huddersfield Literary and Scientific Society—Geological Section—"The Quaternary Epoch."—Mr. C. P. Hobkirk. Bradford Scientific Association—"How to examine a Plant Microscopically."—H. Pocklington, F.R.M.S.

EXCHANGE, &c.

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Original Articles.

ON THE PRESERVATION OF LEPIDOPTEROUS LARVÆ.*

BY JOHN W. ELLIS.

IN consequence of a few specimens of preserved larvæ having been shown at our last meeting by Messrs. Whitby, West, and myself, I have been asked by your president to contribute a paper containing a description of my process. The remarks I have to make will not be new to those of you who see the *Entomologist*, since it was in those pages that I first found a description of the process; but to those who do not see that journal, I hope a few remarks on my process will not be uninteresting.

First, as to the instruments necessary: and of these, the fewer and simpler the better. They are comprised in a couple of blow-pipes, a pair of fine-pointed forceps, and an oven of some description. The blow-pipes can be easily made by softening a piece of hard glass tubing in the flame of a spirit lamp or gas jet—when, on drawing the ends of the tube apart, the softened portion will be drawn to a fine point. A piece of tubing eighteen inches long will make two nice blow-pipes. One of the tubes should be left with a very fine orifice, for such larva as the *Eupitheciæ*; the other should be broken off until the point of a good-sized needle can be inserted into the orifice. This will do for such larva as *Cratægata* and *Grossulariata*. To the end of each blow-pipe should be firmly bound a piece of watch-spring, so as to clasp the anal flap of the larva when the tube is inserted into the anal orifice.

In a paper in the *Entomologist* for April, 1876, you will see that the writer recommends the use of two springs, at opposite sides of the point of the blow-pipe; but I have found that unless the greatest care be taken, there is danger of injuring, or at all events preventing the perfect inflation of the hinder pair of pro-legs, if two springs are used. Since beginning my experiments I have altogether discarded the use of the second spring, as being too much in the way, and not at all required.

The forceps should be fine-pointed, and are used for stretching the anal orifice of some larva before the blow-pipe can be inserted, care being taken of course not to tear the skin.

* Read before Lancashire and Cheshire Entomological Society, Oct. 29th.

The oven may be of sheet iron or tin. A round or square tin canister will do very well, provided a hole an inch or inch-and-a-half in diameter be cut in the lid or bottom. The canister should then be laid on its side and heated by means of a spirit lamp or gas jet. The temperature to be employed must be found by experience, but as a rule a dark larva will bear a greater amount of heat than a light or green one. Care must be taken, also, in drying hairy larvæ, for if too great a heat be used the hairs will be singed, and the specimen spoiled. In drying the larvæ, the blow-pipe should be held horizontally, the operator resting his elbows on the table—and not vertically, with the larva hanging head downwards, as recommended in the paper above-mentioned : for, apart from the disagreeable and injurious effects of the heated air on the eyes of the operator, in nine cases out of ten the larva will have its head burnt before the tail is perfectly dry. Again : supposing the heat employed be not sufficient to burn the larva, the exertion of keeping up a sufficient force of wind is very much greater in a standing than in a sitting position.

Now for the process. In selecting a larva for preservation, pick one, if possible, soon after changing its skin, as the new skin is both brighter in colour, and not so thick as in an old one, and therefore requires less heat. Kill it by dropping into spirits of wine, or in the cyanide bottle. Personally I prefer the spirit, for it acts much quicker and with more certainty. For hairy larvæ, too, it is an advantage to have the skin moist while pressing the larva, as then the hairs are not so liable to be rubbed off. Having killed the larva, empty the skin of its contents by rolling over it, from head to tail, a piece of glass tubing, or round piece of wood, *e.g.* a lead pencil—taking care to commence rolling at a short distance from the anal aperture ; for if the whole of the viscera be forced forward at once, there is danger of bursting the skin. Too much pressure should not be used, or the colouring matter will be rubbed off the inside of the skin. In green larvæ the colour in great part depends on the food in the intestinal canal, so that no care can entirely prevent the colour from being lost in these larvæ. Some recommend the use of alum-water as a preservative of colour, but I have not found any better effects by its use.

After the skin is emptied of its contents, it should be gently pressed between blotting paper, to absorb any superfluous moisture, and then the blow-pipe should be inserted, the steel spring clasping the larva by the anal flap, as it is termed. Upon blowing through the tube the skin will be distended, the right amount of pressure to be used being

left to the operator. Care should be taken that the hinder pro-legs are well distended, as a great deal of the beauty of the larva depends on the full inflation of these legs. If the inflation appears natural, introduce the larva horizontally into the oven, and twirl the tube round and round during the process of drying, which takes from one-half to two minutes, according to the heat employed, and the thickness of the skin. After cooling, carefully remove the skin from the end of the blow-pipe, using a drop of water to moisten the end, if it should stick to the tube. The larva must then be mounted on a piece of wire covered with silk or green paper, or on twigs of the natural food-plant. Wire is preferred for many larvæ, as it can be easily bent to fit the legs. In many of the *Geometræ* the skin takes a semi-looped position, so that it is sufficient to attach it by its hinder pairs of legs. With regard to means for making caterpillars dry in a looped position, I cannot say anything, as I have not had a good opportunity for trying any of them.

I must, in conclusion, say a few words on a form of apparatus described in the *Entomologist* for last September, which is well adapted for those whose lungs are not in sufficiently good order, or who are otherwise incapacitated from keeping up a full blast of air. It consists of a wide-mouthed bottle, fitted with a cork, through which pass two tubes—one communicating with the blow-pipe, the other with an India-rubber ball or pair of bellows ; at the bottom of the last tube is a valve of oiled silk, which prevents any return of air along this tube. Air forced into the bottle escapes so slowly through the blow-pipe, that a constant stream can be sent into the larva with very little trouble.

My friend Mr. Whitby has had some good results by using fine sand for the inflation of the skin of large larva, e.g. *Occellatus*. The skin is filled through a glass tube in the shape of a funnel, and the sand is rammed tight with a piece of wood or wire, so as to leave no wrinkles on the surface. The colour is not so much affected by the heat in this manner, as a very slight amount of heat will be sufficient, after a long exposure to it, to dry the skin.

[I feel sure that if Mr. Ellis will try the method described by me in the *Entomologist* of October last, he will never again adopt the mouth-blowing process, notwithstanding that his lungs are in the best possible order.—G. T. PORRITT.]

HINTS ON NATURAL HISTORY COLLECTING.

By H. F. PARSONS, M.D.

(Concluded.)

IN Botany, besides the name we should record the date. The day and month will show the time of flowering ; the year is worth recording, for various reasons, especially in the case of introduced and newly recognised plants, or of those that are feared to be dying out. The record of locality should show not only the name of the place, but also the county or "vice-county." We should also record the habitat—*i.e.* the sort of place in which our plant is growing : *e.g.*, "limestone rocks," "pond," "hedge bank," "corn field," &c. The geological formation should also be noted, as very different groups of plants are found on different soils. The approximate altitude above the sea-level, or in the case of marine plants, beneath it, should be stated. Some of our plants are only found at low levels, others only on mountains, while a few—as the whortleberry and the little bedstraw (*Galium saxatile*) are found from the sea-level to the summits of our highest British mountains. The zones of elevation adopted by Mr. H. C. Watson in his writings on the distribution of British plants, are six—viz., three agrarian, and three arctic. The boundary between the agrarian and arctic zones is marked by the highest limit of the cultivation of corn, and by the highest limit of the brake fern—*i.e.*, about 1500 feet. The agrarian region is divided into infer-agrarian, mid-agrarian, and super-agrarian zones : the first being characterised by the presence of the wild clematis ; the second by the absence of this shrub, but by the continued presence of the buckthorn, the maple, the black and white bryony, the cornel, and the spindle-tree ; the third by the absence of these common hedge-row plants. The arctic region is divided into infer-arctic, mid-arctic, and super-arctic zones, which are marked by the successive disappearance of the cross-leaved heath and the ling. High north latitude has the same effect upon the flora as elevation ; thus, plants are found on the sea-shore in Scotland, which in England are mountain plants. The infer-agrarian zone includes the part of England south of the Humber, Trent, and Dee, and rising to a height of about 900 feet ; the mid-agrarian zone occupies the low grounds between the Humber and Dee on the south, and the Clyde and Tay on the north (this is therefore the zone in which the lowlands of Yorkshire are situated) ; in the north of Scotland the land near the sea-level is in the super-

agrarian zone. The zones cannot be sharply defined, since the presence or absence of the characteristic plants is greatly influenced by the presence or absence of suitable soil, as well as by the aspect.

Another point that should also be noted, although nothing but long experience will enable one to give a trustworthy opinion, is the "citizenship"—*i.e.*, the degree of probability of our plant being a native or introduced. There are some plants, such as the heaths, furze, and daisy, which every one will admit to be true natives of our island ; others, such as the celandine, the goutweed, and goose foot (*Chenopodium Bonus-Henricus*), are found apparently wild, but yet only in the neighbourhood of houses, or in places to which they may have been introduced by human agency : these are called "denizens" by Mr. Watson. Another class of doubtful natives are those called "colonists," which are found only in cultivated fields, and seem to depend for their existence upon human agriculture. A familiar example is the red poppy :

"Poppies, 'tis known to all who rove,
Grow in the field, and not in the grove."

Others are the corn cockle, the corn marigold, and the blue bottle. Plants known to have been introduced, as the sweet chestnut and the water thyme (*Elodea canadensis*), are called "aliens," however firmly they may have established themselves ; while those which appear accidentally, and die out without establishing themselves, are called "casuals," *e.g.*, the thorn-apple and many others, which may be found on ballast and rubbish heaps, and on roadsides. Young botanists are usually too ready to consider every plant they find a native : caution comes with age. As memory is treacherous, and life uncertain, our notes should be written down at the time, and labels should be authenticated with the collector's name.

In arranging our collection in the cabinet, the rule should be to group the specimens according to their natural affinities, those kinds most nearly allied being placed next each other. It is necessary sometimes to depart from this rule in the case of very large specimens which the exigencies of space will not allow to be grouped with their congeners. Another exception occurs in the case of fossils, which the usual and preferable plan is to arrange primarily in the order of the strata in which they are found, the fossils of each formation being separately arranged according to their natural affinities, zoological or botanical. Collections from different regions may also be kept separately sometimes with advantage.

To arrange shells, butterflies, or sea-weeds in pretty patterns may be a harmless amusement, but it is not science. Of course if we can arrange our specimens tastefully, so as to be pleasing to the æsthetic but unscientific eye, so much the better, but it must not be at the expense of obliterating their characteristic features ; we must not, for instance, disturb the natural arrangement of the leaves of a dried plant in order to make them fit neatly into a vacant space. In naming them, the scientific name should always be given if known ; the generic name alone if the specific name be not known ; and the name of the order or family should also be written in the appropriate place. Whether the English names should be given or not is a matter of taste and convenience ; they certainly add to the interest of the collection in the eyes of non-scientific people, but I do not think it worth while to invent English names for things that have not them already, still less to discard our well-known and old-established English names in order to substitute for them new-fangled appellations framed on the pattern of the Latin names. Thus, we all know the "black bryony," but who beside a botanist would guess what plant the "common tame" was ?—and he would know it better as "*Tamus communis*." The beautiful system of scientific nomenclature now in use was invented by Linnæus, and is used for all animals and plants, recent and fossil. A species is an assemblage of individuals differing only in inconstant or sexual characters. Those species which most nearly resemble each other are grouped together into a "genus." Thus, the apple and the pear are two species belonging to the same genus, *Pyrus*, the apple, being *Pyrus malus* (*malus*, an apple), and the pear *Pyrus communis* ; the dog-rose is *Rosa canina* ; the French rose, *Rosa gallica* ; the cabbage-rose, or 100-leaved rose, *Rosa centifolia*. Each kind has thus two names—that of the genus and that of the species, which may be compared to the christian and surname of an individual, only that the generic or family name is placed first, in accordance with the custom of the Latin language, this language being chosen on account of the harmony of its sounds and of the convenience with which compound words can be formed, and more especially because it is known by educated men in all countries. People sometimes complain that the Latin names are hard to remember ; they are not so, however, if we will take the trouble to learn their meaning, which may generally be found out with the aid of a dictionary, and a very moderate stock of classical lore. Thus, *Chrysosplenium oppositifolium* seems a long name, but it is not really difficult when we know that the golden saxifrage was called *Chryso-*

splenium from the yellow colour of its flower, and because it was thought to be a cure for diseases of the spleen, and that the commoner kind is called *oppositifolium* because its leaves are opposite, whereas in the other species they are alternate. Opposite-leaved golden saxifrage is just as long.

Besides the want of judgment and system in observing and recording, there is another circumstance which frequently renders the collections of amateurs of little or no value, viz., that they too often confine their attention to certain well-known and conspicuous orders of animals and plants, to the neglect of others equally important but less attractive. Thus, of people who call themselves entomologists, nine out of ten collect only lepidoptera, and many only butterflies ; even of the lepidoptera the smaller and less conspicuous families, as the *Tineidæ*, are usually neglected, while the other orders of insects, as the *Hymenoptera*—bees, wasps, and ants—the beetles, the two-winged flies, the dragon-flies, the *Orthoptera*—grasshoppers, &c.,—remain an unknown world, although many of the insects of these orders far surpass the lepidoptera in the beautiful adaptations of their organs, in the interest attaching to their habits, and in their importance to mankind. There are, in fact, fashions among collectors in natural history as in other things. For instance, every one who has a few big stones piled up together in a corner of his garden, collects ferns, and digs up the choice kinds by the barrow-load to plant on his rockwork, where they will not grow, selfishly ignoring those who will come after him ; thus most of our rarer ferns are rapidly becoming extinct. On the other hand, there is another order of plants, called *Umbelliferæ*, rather more numerous in Britain than the ferns, some being among our commonest plants, and others among the rarest. In beauty of foliage they are at least equal to the ferns, and in usefulness to mankind they far surpass them. They have not, it is true, as a rule attractive flowers, but neither have the ferns ; the British species have well-marked characters, and are easily identified. Yet, while ferns are sought after so regularly, *Umbelliferæ* are slighted and passed by. I have often heard amateur botanists say, “ Oh ! I never attempt the *Umbelliferæ* ” ; and while a fern is a thing for a bouquet, a picture, or a sonnet, carrots and parsley are scarcely spoken of without a sneer. I rather think, however, that the utility of a thing often tends to lessen the estimation in which it is held by us ; thus the swan, which is merely ornamental, is esteemed a nobler bird than the more useful, if less dignified goose. It is too common to neglect ugly and uninteresting-looking creatures. This

is wrong, for although beauty has a just claim upon our regard, yet its absence in a plant or animal, as in a human being, ought not to make us despise them. Not, however, that any animal or plant is really devoid of beauty; if we examine it closely we shall always find such an adaptation of structure to function as may well excite our admiration. While on the one hand many large and important orders of animals and plants are passed over unnoticed except by the professed zoologist or botanist, on the other hand the number of collectors at work on the fashionable orders is such as to cause a serious diminution of the numbers, or even the extinction, of the rarer species. In botany the ferns are a notable instance, but the same thing takes place with other conspicuous and attractive plants, as the *Orchids*. No sooner does a rare bird make its appearance than it is relentlessly pursued and shot. I cannot think, however, that these ravages are to be blamed to science, but rather to the greed of gain, to the love of destruction under the name of "sport," and to the thoughtless and selfish rapacity of collectors for fashion's sake. The true man of science seeks to preserve and not to destroy. The buying of specimens, especially of dealers, should be discouraged, as it stimulates the activity of a class of collectors who are influenced by no considerations higher than those of gain, and this leads to the extermination of rare species. This does not hold good in the case of geological specimens, for here the field is practically exhaustless; and the knowledge that such things have a money value induces quarrymen to preserve specimens which would otherwise be thrown away as useless.

If, then, there are any among my audience who are commencing, or thinking of commencing, the study of natural history, I would strongly urge them not to confine themselves to the fashionable orders, but to take up the neglected ones. It may perhaps be necessary to start along some beaten path, but depend upon it you will see more of the beauties of nature in the bypaths than on the high road, and you will find a wider field open to you, and a larger harvest remaining to be reaped. The botanist who confines himself to the flowering plants has nothing to do out-of-doors for nearly half the year, whereas the cryptogamic botanist is never without objects of interest. In the autumn and winter, when the flowers are fading and gone, the woods and fields abound with fungi; in winter and early spring most of the mosses and liverworts are in perfection; later in the spring is the best time for the fresh-water algae; while lichens may be found all the year round. The mosses and lichens have this great advantage

for busy people, that it is not necessary to spread them out to press at the time of gathering ; they may be dried as they are, and will recover their freshness when moistened after the lapse of years. Another circumstance which renders the study of the lowest forms of animal and vegetable life especially interesting and instructive is, that owing to the simplicity of their parts and the transparency of their structures, it is possible to gain from them a deeper insight into the mysterious processes of life than can be readily obtained in more complex beings. Thus, to attain an accurate knowledge of the anatomy of the human body is the work of years, but that of a Rotifer or an Infusorium may be seen at a glance. The fresh-water algæ among plants, and the *Crustacea* and *Annelida* among animals, are examples of orders everywhere to be met with, with forms sometimes of great beauty, and life histories of wonderful interest, which however are entirely neglected by amateur botanists and zoologists, or only worked at in a desultory manner as "microscopic material."

Microscopic observers may, I think, be divided into two well-marked classes—those who look upon the animal, vegetable, and mineral kingdom as yielding "objects for the microscope," and those who look upon the microscope as an instrument for the investigation of animals, plants, and minerals. The first class use it as a toy, the second as a tool. I need hardly say that it is in the latter light that I would have you regard it. The microscope is indeed essential in the study of the smaller invertebrate animals and cryptogamic plants, and this is no doubt one reason why these are neglected : for, besides that microscopic manipulation and the mounting of objects require some amount of time and skill, there are many working-men naturalists who do not possess a microscope. To such I would say, get one ; a really useful microscope can now be bought for £5 or £6, and fourpence a-day put by for a year to buy a microscope will yield far more permanent enjoyment than if spent on beer and tobacco. Few respectable households are without a piano, and a piano costs four times as much as a microscope. A few hints on the purchase of a microscope may perhaps be useful. The popular idea concerning a microscope is that its value depends upon how much it will magnify, and that the bigger the microscope the more it will magnify. Both these notions are quite wrong. The magnifying power of a microscope depends upon the glasses, and not on the size of the brass stand ; and the lower powers are not only much easier and satisfactory to work with than the high ones, but practically more useful. For the resolving of difficult test objects we must have object glasses

of high power, with wide angular aperture and special methods of illumination, but, in ordinary physiological and botanical work, one meets with little that cannot be done with an ordinary inch and a quarter inch objectives. The really important point in an object glass is that it give a clear definition. As a microscope is meant to be looked through rather than to be looked at, a long stand is a disadvantage, as rendering it heavy and cumbrous to carry about. The great point in a stand is that the microscope shall be ready for work the instant it is taken out of the box; if it takes a quarter of an hour in screwing and unscrewing before you can get to work, you are not likely often to use it. It is better not to buy more apparatus at first than you know how to use, but to add afterwards what you find you require. There is one piece of accessory apparatus, however, which adds so greatly to the working power of a microscope, that I would advise every one to have it, viz., a double nose-piece, by which one can change the object glass without the trouble of unscrewing and screwing.

The most formidable difficulty in the way of the investigation of some of what I have called the "neglected orders" is the want of accessible handbooks. The observer in isolated country places has no opportunity to hunt up information scattered through the pages of scientific journals, and the transactions of learned societies—British and foreign. For instance, there is no British work on fresh-water algæ more recent than Hassall's, which was published at 36s. in 1845, and of which second-hand copies are now sold for £4 4s. On the other hand it may be said that if more observers worked at these orders, to get together materials, and create a demand for handbooks, the books would soon be written.

It may be said, with much justice, that any one of the natural sciences opens to us such a wide field that we cannot expect to cultivate the whole of it successfully, but must confine ourselves to one corner if we wish to study it thoroughly. This, however, is no reason why all the cultivators of the field should choose the same corner. It is a question whether it is better that we should have a wide or a deep knowledge—should know "*multa*" or "*multum*"—should have a superficial knowledge of many subjects or a profound knowledge of a single subject. I think that of the two, to have a wide knowledge of many matters tends most to expand a man's mind and sympathies, and to render him an intellectual and agreeable companion; but that by confining his attention to one thing, and studying that deeply, a man of average mental power is more likely

to make additions to the sum of human knowledge. The natural sciences are, however, so closely interwoven that it is impossible to study one properly without a knowledge of the others; and therefore I believe that the true rule and the standard which we should place before us, impracticable of attainment though it be, is, "to know something about everything, and everything about something."

LIFE HISTORY OF *CUCULLIA CHAMOMILLÆ*.*

BY WILLIAM JOHNSON.

I HAVE been in the habit for many years of taking this insect, sparingly, so last year thought I would try to find the larvæ. The second week in June I commenced my search, and after trying several localities, was at last successful, and by the end of July had a goodly number. I found them all sizes—from three-eighths of an inch long to fullgrown ones, feeding on the wild chamomile (*Anthemis Cotula*), the flowers seeming to be the best relished, as they would devour the middle in a very short time, and then go to another; not disdaining, however, to eat the leaves if there were no flowers to be had.

These larvæ are very beautiful, and vary much in colour. They are well described in "Newman's British Moths." They have a peculiarity which I have not noticed generally in other larvæ—they seem to be very sensitive, and soon take alarm, as the least touch of the food-plant constantly stops their feeding; and if the annoyance continues, they commence a wriggling and twisting which is quite amusing. They then fall to the ground, but no sooner drop than they are on their feet again, and if all is still, at once mount the plant again and commence feeding ravenously; but in the breeding-cage they lose this timidity, and if you hold a fresh flower to them, they will commence feeding on it without any fear.

They are very much infested by a small Ichneumon, and when they are about three-eighths of an inch long, and appear to be moulting, the larvae of this Ichneumon will be seen emerging from its body, and, as it comes out, forming its own cocoon at the same time. They are also subject to the attacks of another fly, one of those with the striped body, red eyes, and proboscis, which poise themselves in the air on a hot sunshiny day and make such sudden darts. I stood and watched both fly and caterpillar, but so sudden is the attack of this fly, that it is impossible to follow it with the eye. By the contortions and falling

* Read at the August Meeting of the Lancashire and Cheshire Entomological Society.

down of the caterpillar, I have no doubt in my own mind but that it had received the egg of this fly, or that the attempt had been made to deposit it. After pupation of *Chamomillæ*, the larva of this fly emerges from it and immediately goes into pupa itself; and in about nine days some of the flies emerge, others remain in pupa till the following spring. The imagos of *Chamomillæ* begin to emerge about the middle of April, and continue until the last week in May, and, like the caterpillars—they vary much in colour, the dark varieties being produced from the dark larvæ, and *vice versa*.

The larvæ of this insect appear to be common all round this district, as the food plant is extremely abundant on the waste lands, railway banks, and on the margin of cornfields; I have taken it at Wallasey, Bootle, Digbeth, Crosby, and in the neighbourhood of Chat Moss, and have heard of its being taken at Southport, Lytham, and Garston.

Short Notes and Queries.

NESTING OF STONECHAT.—I should be very glad if you or any of your readers would furnish me with any information as to whether the stonechat breeds annually on any of the moors in the West Riding of Yorkshire. I know it is stated in most works on ornithology that it is common, and generally distributed, in suitable localities throughout England, yet I have performed several excursions to our neighbouring moors for the express purpose of discovering its habitat, but all my efforts hitherto have proved fruitless.—E. P. P. BUTTERFIELD, Wilsden, Bingley, Dec. 12th.—[The stonechat breeds annually in stony, but not necessarily moorland places around Huddersfield and Halifax, also on the heathy hillsides about Diggle, as well as in many other similar spots.—Eds. Nat.]

HYMENOPTERA (ante p. 40).—On looking over the minute-book of the Huddersfield Naturalists' Society, I find that on Oct. 20th an egg of the red-backed shrike was exhibited, "taken from the neighbourhood of Farnley," which is not more than two miles from the place where Mr. Varley picked up his bees—thus, I think, entirely confirming Mr. Smith's theory as communicated by Mr. Roebuck.—S. L. MOSLEY, Primrose Hill, December 10th.

***Thuyidium abietinum* IN YORKSHIRE.**—I am advised by Dr. Lees to make known in the *Naturalist* the detection by me of the moss *Thuyidium abietinum* in an old disused stone quarry near Wetherby. I send you a specimen of the above, which I have had verified (with his usual kindness) by Mr. Boswell, of Oxford. Since first finding it, I have found it in better condition in another quarry; it is, probably, therefore, not so rare as has been supposed. Dr. Lees tells me it has not yet been given in any book or list of Yorkshire mosses. Anyone wishing for it can

have a supply by writing to me. I would guide any student of mosses to the place, but am advised not to mention the exact locality, lest it should be extirpated, and thus the chance of its increasing and bearing fruit in the spring be taken away.—J. S. WESLEY, Wetherby, 19th Dec., 1877.

SYENITE.—*Origin of Name.*—I must beg to correct a remark made by one of our correspondents in last issue (p. 78) in the report of the Ovenden Society. *Syenite* does not owe its name to *Mount Sinai*, with which the name has no possible connection, but it derives it from the town of Syene (in Central Egypt), on the Nile, a short distance to the north of the First Cataract, where this mineral was first found.—C. P. H.

SPLENDID METEOR.—Last evening I saw here a most extraordinary meteor ; its position I imagine would be N N W, and the direction oblique towards the earth. In appearance at first sight it closely resembled an enormous rocket, with a very luminous tail. I watched it traversing with incredible rapidity the infinity of space, and then suddenly and noiselessly exploding, it illuminated the horizon, &c., with a brilliancy far in excess of what one might expect from twenty rockets. Then continuing its course still lower, it repeated the same magnificent phenomena, only accompanied by what seemed like small red balls of fire, regular in form : these latter fell a little lower and then vanished. The time would be 8-27.—E. B. WRIGGLESWORTH, Wakefield, Nov. 24th.

Rainfall for November.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL. TO DATE.		Date of heaviest Fall.	Amount of heaviest fall.
				1877.	1876.		
Huddersfield (Dalton)..... (J. W. Robson.)	350	In. 3·68	19	37·95	*29·35	21st	0·79
Wakefield	120	2·06	22	...	...	21st	0·46
Leeds ... (H. Crowther.) ...	183	2·79	19	32·30	24·88	21st	0·67
Halifax	360	...	...	...	...	...	...
Barnsley .....(T. Lister.) ...	350	1·98	19	31·88	26·63	12th	0·35
Ingbirchworth ... (Do.).....	853	5·87	23	37·03	46·79	21st	1·00
Wentworth Castle (Do.).....	600	3·62	17	...	...	22nd	0·79
Goole... (H. F. Parsons.) ...	25	1·51	16	24·70	21·35	21st	0·33

* This is the average to date for 11 years, 1866-76.

Reports of Societies.

BARNSTABLE NATURALISTS' SOCIETY.—Monthly meeting, Dec. 3rd, the president, Mr. T. Lister, in the chair.—Mr. A. Kell exhibited 15 eggs of the common guillemot, all differing in tints and markings ; one egg of the razorbill, and two very beautiful specimens of the honey-buzzard's egg. The following additional particulars of occurrences and movements of migrating and resident birds, were brought to the attention of the meeting :—The redwing and fieldfare last week in September ; the hooded crow Oct. 3rd. These complete our list of visitants from North Europe. Mr. Kell reported specimens of the merlin which he had lately obtained from the moors beyond Penistone, where it occasionally breeds. It is a partial migrant, generally coming from North to South Britain for the winter. On Nov. 22nd golden-eyed ducks were abundant in Dunford reservoir ; one was sent by Mr. C. Wemyss to Mr. G. Rose, who also has heard many ducks, amongst them wigeons flying by night over Barnsley. A pair of carrion crows, scarce with us, were seen in Carlton-lane ; large flocks of mountain finches came from the moors in October, and still abound where there are beech-nuts and other favourite food. The coletit was seen Dec. 1st ; it breeds chiefly in North Britain, although we have seen the nest and bird in New Park. Many lapwings, snipes, kestrel, gold-crested wrens, kingfishers, &c., have been noted.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Annual meeting, Dec. 12th.—The financial statement was very satisfactory, a balance being left in the treasurer's hands, and the work recorded in the Society's proceedings shows that there have been many diligent members. During the year the Society has held twenty-four meetings, all of which have been fairly attended, and lectures and papers have been given ; the library has also been increased. The Society was efficiently represented at all the rambles of the Yorkshire Naturalists' Union. The officers elected were—president, Mr. William Jagger ; corresponding secretary, Mr. West ; delegate to the council meetings of the Yorkshire Naturalists' Union, Mr. Jagger, &c.—WM. PREST, Sec.

GOOLE SCIENTIFIC SOCIETY.—Meeting Nov. 21st.—A paper was read by Mr. H. T. Gardiner on “The History of Goole and its Neighbourhood prior to 1650.”

MEETING Dec. 5th.—A paper was read by the president, Mr. C. Hunter, F.C.S., on “Insects injurious to Crops.” The author, after tracing the history of the study of entomology from the earliest times to the present century, gave a brief sketch of the anatomy, life history, and classification of insects. He then took the principal crops *seriatim*, treating of the insects by which each was liable to be attacked ; and concluded with an account of the Colorado beetle, from which he was of opinion that we

had no more to fear in this country than from the locust. The lecture was illustrated by a number of diagrams, specimens British and foreign, and microscopic slides.—H. FRANKLIN PARSONS, Sec.

HUDDERSFIELD SCIENTIFIC CLUB. — The annual dinner and meeting were held at the Queen Hotel, on December 8th, the president, Mr. C. P. Hobkirk, in the chair. Officers for the ensuing year were elected as follows :—President, Mr. G. T. Porritt, F.L.S. ; vice-president, Mr. Joseph French ; secretary, Mr. George Brook ter. ; librarian, Mr. S. D. Bairstow. The report showed a satisfactory balance in favour of the club. The remainder of the evening was spent in conversation and discussion as to the best methods of working so as to promote the interests of the club.

LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION. — 271st Meeting, Nov. 20th, the president, Mr. James Abbott, in the chair.—Mr. Henry Crowther showed a Leeds specimen of *Limax flavus*, and drew attention to the minute parasites (*Philodromus limacum*) which infested it, running in and out of the slug's breathing orifice. Mr. John W. Taylor exhibited *Helix incarnata*. The president showed with the microscope the otoliths of *Sphaerium lacustre*. Insects were shown by Mr. Chas. Smethurst, and Mr. F. Emsley exhibited under his microscope various diatoms, *Volvax globator*, and the ciliary action in the common mussel (*Mytilus edulis*).

272ND MEETING, Nov. 27th, the president in the chair.—Paper read : “How to examine a plant microscopically.”

273RD MEETING, December 4th, the president in the chair.—Mr. W. Nelson presented to the local collections specimens of *Sphaerium rivicola* and *S. ovale*, from Frost Dam, near Leeds ; *S. corneum* from the canal near Wakefield ; and *S. lacustre* from Ferrybridge, and from Thorne's Farm, Osmondthorpe, near Leeds. Mr. John W. Taylor presented *Helix hortensis*, *H. hybrida*, and *H. cantiana*, from near Boston Spa ; *Balea perversa*, taken on walls north of Inglebro' ; *Helix cantiana* and *Clausilia rugosa*, from the outskirts of Ripon ; *C. rugosa* var. *dubia*, *Bulininus obscurus*, *Pupa umbilicata*, *Helix rupestris*, and *H. lapicida*, from West Witton, Wensleydale. Mr. Taylor exhibited *Lymnaea stagnalis*, var. *fragilis*, from Folkestone ; *Helix carthusiana* from Lewes ; *H. hybrida* from Folkestone, from Faversham in Kent, and from Bilston, near Bath ; *H. ligera* from East Tennessee, and *H. palliata*, Say., from Lock Haven, Pennsylvania. Mr. W. Nelson exhibited *Sphaerium striatinum*, Lam., and *S. securis*, Prime, from Ann Arbor, Michigan ; *S. sulcatum*, Lam., from Wayne County, Mich. ; *Valvata tricarinata*, Say., from Erie Canal, New York ; *Bythinia tentaculata* from a pond at Alum Rock, near Birmingham ; *Limnea humilis*, Say., from Grand Rapids, Mich. ; *Planorbis campanulatus*, Say., Detroit River, Mich. ; *Goniobasis liviscens*,

Menke, Erie County, New York ; *Pleurocera subulare*, Lea, River Rouge, Mich. ; *P. canaliculata*, Say., Cincinnati, Ohio ; *Melanthon integer*, Say., Evans Lake, Mich. ; *M. obesa*, Lewis, South Bend, Indiana. Mr. Charles Smethurst showed two specimens of *Colias Edusa* in addition to what have already been reported, both taken at Headingley this season. Mr. W. Denison Roebuck showed both sexes of *Mutilla Orcus*, Cresson, from Bosque County, Texas. In these insects, as in the rest of the family *Mutillidae*, the males only possess wings, the females being deprived of that source of enjoyment. Mr. F. Emsley showed various microscopic objects.

274TH MEETING, Dec. 11th, the president in the chair.—A lecture was delivered by Mr. John Thripleton on “Russia : or some account of my visit to St. Petersburgh and Moscow,” which was illustrated by a large number of photographs thrown on a screen by the lantern, under the management of Mr. Tancred.—WM. DENISON ROEBUCK, Sec.

MIRFIELD NATURALISTS' SOCIETY.—Meeting Nov. 8th, Mr. Luke Holt in the chair.—A lecture was given by Mr. Joseph Tindall, of Huddersfield, on “The Geological Evidence of the Antiquity of Man.” The lecture was illustrated by diagrams and geological specimens, and elicited a short discussion.

STAINLAND NATURALIST'S SOCIETY.—Monthly meeting, Dec. 4th, at Burwood, Mr. C. C. Hanson in the chair.—The following specimens were exhibited :—Mr. B. Garside, a long-eared owl and kingfisher ; Mr. Faikes, a pair of squirrels. Interesting papers were read on natural history.—W. H. STOTT, Sec.

WAKEFIELD NATURALISTS' SOCIETY.—Monthly meeting, Dec. 6th, Mr. Henry Sims in the chair.—The Room Committee reported that in January (which will be the annual meeting), the Society will meet in its new rooms. The secretary exhibited a pair of rock pipits, a white variety of the house sparrow, shot at Crofton, near Wakefield, and a kittiwake gull ; Mr. J. Fogg, woodcock ; the secretary, a case containing a quantity of flint arrow heads, spear heads, worked slingstones, and flint chippings.—J. SPURLING, Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting, Dec. 12th, Mr. G. C. Dennis in the chair.—Mr. Jackson exhibited the following insects :—*Dianthæcia albimacula*, *Fidonia carbonaria*, *Penthina prælongana*, *Sciaphila peterana*, and *Mixodia Ratzburgiana* ; Mr. Wm. Simmons, a fine box of *Tortrices* and *Tineæ* ; Mr. R. Cook, a specimen of *Colias Edusa*, taken near York ; *Sesia chrysidiiformis*, *Tapinostola Bondii* and *elymi*, *Cucullia chamomillæ*, *Ennomos tiliaria*, *Boarmia abietaria*, and *Oporobia dilutata* (var.) ; the secretary, Mr. Prest, a fine bred series of *Macaria alternata*, *Acidalia degeneraria*, *Dianthæcia cæsia*, *Xylina conformis*, *Heliothis peltigera*, *Diasemia literalis*, *Ebulea stachydalis*, sent him by Mr. C. G. Barrett.—WM. PREST, Hon. Sec.

Diary.—Meetings of Societies.

- Jan. 1. Bishop Auckland Naturalists' Club. Liversedge Naturalists' Society.
,, 2. Goole Scientific Society—Paper, "Animal Parasites," R. Blair, M.D.
,, 5. Mirfield Naturalists'—Paper by Mr. John Newsome.
,, 7. Huddersfield Naturalists', 8 p.m.
,, 8. Leeds Naturalists' Club, &c.—Entomological Section.
,, 9. York and District Naturalists' Field Club.
,, 11. Huddersfield Scientific Club, 8 p.m.
,, 14. Huddersfield Literary and Scientific Society—Microscopic Soirée.
,, 15. Leeds Conchological Society—Opening Address by the President,
Wm. Nelson.
,, 16. Goole Scientific Society.
,, 17. Huddersfield Literary and Scientific Society—Microscopic Section,
"Heads of Insects." G. W. Rhodes, M.R.C.S. North
Staffordshire Naturalists' Field Club—Meeting at Longton.
,, 19. Huddersfield Naturalists'.
,, 22. Leeds Naturalists' Club, &c.—Paper, "Matters used in the permanent
preparation and examination of microscopic subjects." W.
Barwell Turner.
,, 28. Huddersfield Literary and Scientific Society.—Paper, "The Geo-
graphical distribution of living Plants."—Joseph French.
,, 29. Leeds Naturalists' Club, &c.—Entomological Section.
,, 30. Goole Scientific—Paper, "Mollusca."—Rev. R. D. Maxwell.
,, 31. Huddersfield Literary and Scientific Society—Microscopic Section,
"Wing-Scales of Butterflies."—George Brook, ter.

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A G O S S I P

ABOUT TWO NEW LINCOLNSHIRE CRYPTOGAMS : *(HYPNUM SALEBROSUM AND CETRARIA ISLANDICA).*

By F. ARNOLD LEES, F.L.S.

THE *Naturalist* will, I daresay, be thought a fitting place for a record of the detection, near Market-Rasen, very recently, of two plants hitherto unrecorded for Lincolnshire—the little-known moss, *Brachythecium salebrosum*, Hoffm.; and the alpine lichen, *Cetraria islandica*, Linn, called familiarly “Iceland Moss.” With the latter I shall couple a club moss seen growing near Crossby, a few years back, by the Rev. W. Fowler.

Their occurrence in North Lincolnshire merits a detailed notice, and may in addition be made a medium for the conveyance of certain views as to plant-distribution.

I. As to the true moss. *B. salebrosum* would appear (and Mr. Hobkirk will perhaps correct me in a footnote if I am wrong) to be either a really rare species, or else one ill-understood and often overlooked: and it seems to me that the latter is especially likely to be the case, for a reason to be stated presently. It is clearly a moss of wide dispersion, latitudinally if not altitudinally, for in Mr. Hobkirk’s *Synopsis of the British Mosses* only two wide-apart localities are given, and those named specially, viz: “Near Kirkham Abbey, Yorks. (R. Spruce)” and “Sussex (Mitten).” I judge it little-known because the mention of stations thus pointedly is in that work a plan of treatment followed only in the case of very rare species.

On Dec. 3rd, 1877, I gathered a moss which appeared to me to be a form of *B. rutabulum*—a very common, variable species—but upon sending specimens to Mr. H. Boswell, of Oxford, he detected differences that had not struck me in my perfunctory examination, and pronounced them to be veritable *salebrosum*.

This moss grows amongst true *rutabulum*, upon fallen branches, decaying tree stumps, and a mossy bank, by the road from Rasen to Tealby, where it borders a wooded eminence of the Greensand known as Hamilton Hill—at least as yet I have only found it there in this county. It is rather plentiful in the barren state although fruiting capsules do occur sparingly, growing mingled as I have said with

B. rutabulum, and in one place on the ground itself with *Eurhynchium striatum*. I am now about to outrage certain scientific canons by laying stress upon the facies of this moss as the best way to recognise it amongst commoner allied species. In its facies, then—a thing of no account scientifically, difficult to express in words on paper, and yet on the collecting field of great value, and by which the eye with a little training can distinguish most things, from its wonderful habit of collating minute differences, and reasoning unconsciously about them—in its facies *B. salebrosum* bears a very strong resemblance to *B. rutabulum*; quite as close as that between the lowland *E. striatum* and the montane *H. brevirostre*, or that between *Cylindrothecium cinnum* and *E. piliferum*; but the prevailing hue of *B. rutabulum* is a green of a deep ordinary character, and lacks a golden-tinge which is to my eyes very characteristic of *B. salebrosum*, its younger shoots especially. Now that I know both species I can readily distinguish them by their colour alone. But there is another difference which it does not need a lens to find; the barren shoots of *B. salebrosum* appear more plumose, more piliferous-leaved as it were, than in *B. rutabulum*—a fact not owing to the leaves being really longer hair-pointed, but to their being comparatively more gradually narrowed to a point, and closer set upon the stem. These observations, which I give for what they are worth, are the result of several examinations of the two mosses *in situ*; and although some will say they have “no scientific value,” my reason for giving them at such length is that I think they may possibly prove of some little service to others, tyros in moss-study like myself, who may feel inclined to go into the field and bring home *B. salebrosum*! For books do not tell us the sort of thing I have tried at. The *magnum opus* (in a scientific sense) upon mosses may or may not have appeared; but whether because the study of physiognomy—that botanical like that facial—is deemed beneath the attention of scientific describers; or because time and type are not inexhaustible enough to tell us everything; or because the compilers of handbooks to the ologies do *not* know in the living state in the field the objects they daily define in the study: it is certain that books often tell us anything but what beginners would find of most practical and immediate use, leaving us humbler naturalists, as we struggle onwards, to communicate *by letter* to brothers in trouble those “sure tips” to species differentiation which have come to us—a gift from the Spirit of all Nature, only after patient inquiry and loving labour.

After this gossipy digression I return to *B. salebrosum*. When once

stumbled upon it is easily distinguished from *B. rutabulum* by the seta bearing the capsule being perfectly smooth, whilst that of *B. rutabulum* under a lens appears to be encrusted with numerous granular asperities. In habit the mosses are alike. Under a good lens the leaves of *salebrosum* are less striate and comparatively narrower, and hence look more acuminate, whilst the nerve reaches up the centre of the leaf rather further than in *rutabulum*. These are comparative differences only. The *sporangium*, or capsule is, in both species, very similar; but its lid is a *cone narrowing regularly* to a point in *salebrosum*; whilst in *rutabulum* its shape, a cone, too, approximates more nearly to the form of a peg-top, narrowing with a bowed curve for half its length, then more evenly at a different angle, to a point, but terminating in a *sudden sharp beak*, just as a peg-top ends in its iron spike.

And now for the fact that induces me to think the two mosses may often be confused in the field, and the one accounted much the rarer in reality only overlooked. A day or two after my attention had been drawn by Mr. Boswell to the structural differences I have attempted to describe, I was, for purposes connected with the moss chapter of my forthcoming "West Yorkshire" Flora, looking through several packets of *B. rutabulum* collected by me at different times in the West-Riding, when lo! in one of them amongst a matted specimen of true *B. rutabulum* I saw there were a few young but fine fruiting bits of *B. salebrosum*! The moss in the packet was duly labelled as gathered (in 1876) by a rivulet which runs at the foot of Ledsham Park, near Kippax; and I have a distinct recollection of the excursion—a most pleasant one, in which Mr. William Todd of Leeds was my companion—and even of the circumstances under which that tuft was gathered: evening was approaching, and feeling pleasurable pangs of anticipation as to tea awaiting me, I hurried down the streamside towards the pretty little inn of Ledsham with its ever obliging hostess, who, I remember, ministered to some natural wants most successfully. This delayed discovery—if I may so style it—does not add a new species to the West Riding Flora, but the previous records, one of which is William Wilson's, are very old ones.

Apropos of rare mosses, I may as well yield to a gossipy inclination, and state that recently Dr J. S. Wesley has detected both *Cylindrothecium concinnum* and *Eurhynchium piliferum* near Wetherby. These mosses have a particularly similar physiognomy, and the former is an uncommon species of xerophilous—dry, or limestone-loving—type, montane in its restriction usually, and not hitherto recorded for the tract of Permian Limestone.

II. As to the lichen—*Cetraria islandica*—which I lately came across in fine large condition, and in some plenty, growing amongst the fallen fir-needles, that make such a pleasant carpet for the foot, in the large pine-woods to the east of Market Rasen. This is an unexpected and somewhat singular discovery, because ordinarily, in England at any rate, the *Cetraria* is a high alpine or infer-arctic species. It at once called up to Dr. H. F. Parsons (to whom I sent a specimen) the Rev. W. Fowler's discovery, a few years back, of *Lycopodium alpinum* on Crossby Warren, near Frodingham : a fact so very strange that when told me, my state of belief in its *natural* occurrence upon a Lincolnshire Warren not much above sea-level, may be expressed in Cowper's lines :—

Affirmat A. (*Rev. W. Fowler*) :

“ Yes (rather moved), I saw it with these eyes.”

Respondet B. (*F. Arnold Lees*) :

“ Sir, I believe it on that account alone ;
I would not, had I seen it with my own.”

Pleasantries apart, however, I take the one fact to be corroborative of the other ; or rather, since our theories of distribution must give way to, or be made to fit in with facts, I look upon both of these very startling occurrences not as instances of peculiar powers of self dispersion ; but in preference I see in them examples of highly developed faculties for resistance, or elastic adaptation, to changing conditions of climate ; thus enabling the species possessing such faculties to hold on instead of succumb in that struggle for existence going on all around us in the world of flowers as well as in the world of flesh. From this point of view they are last links in a chain of changes connecting the present time with an era, probably immediately subsequent to the eons of the ice age, when Lincolnshire, level as it is, had a flora as wholly arctic or boreal as Iceland has now. These plants were not the outliers of a centre of dispersion situated somewhere on the Grampian or Cumbrian mountains ; but, in this view, the arctic species that still may be found on those hill-ranges, equally with the two Lincoln ones in question, are relics left stranded, where we find them, as the tide of ice and cold retreated into more northern regions. Those left on our mountains are more numerous because the altitudes at which they exist have precluded competitors of tenderer constitution from disputing the ground so hotly as they—emigrants advancing from the south—have done everywhere in England on the lower levels. What a wonderful power of fight

this *Cetraria* must have in it, then, to maintain its ground not merely among its own kind on Yorkshire and Scotch mountains, but on level tracts such as abound in Lincolnshire and Norfolk ! The Rev. W. A. Leighton informs me that it also occurs, in plenty too (*i.e.* holding its own well), at King's Lynn, south of the Wash—a fact that can only have become known recently, for the station is not included in the last edition of my informant's *Lichen Flora—facile princeps* amongst handbooks of its class, but by no means easy to use.

I do not see how the presence of the *Lycopodium* and *Cetraria* in Lincoln is to be explained satisfactorily, save in the way I have outlined. The facts will not admit of two explanations on a par as to probability, as will the existence of the berried *Empetrum nigrum* on Thorne Waste by the wells. Plants may be, nay *are*, often imported into districts foreign to them by wind, by birds, by rivers in spate, and in soil adhering to the roots of planted shrubs or trees ; but I do not see how the *Cetraria* could have come to be where it is by any such means. There has never been a large river running from the Pennine chain of hills, through Lincoln to the coast ; and its soils and surface strata are all of a date subsequent to the Trias : whilst I cannot conceive the *Cetraria*, if I could the *Lycopodium*, having been carried by the wind as a spore. I have been obliged lately to reject that supposition even in the case of a fern, *Asplenium lanceolatum*, of Atlantic type, that was lately discovered by the Rev. R. A. Gatty of Bradfield, growing in a valley amid the moors north-west of Sheffield —a district in which there are many ice-brought boulders, known to the dale-folk thereabout as “ Travellers ” or travelled stones. By a preponderance of probabilities I have been induced to include the fern in the Riding flora as a native, although the station is a long way outside the area hitherto assigned to it in our island, but not upon the ground of its having been blown across-country by the breath of South-west Wind, Esq., in the form of spores.

Again, with regard to the *Cetraria* I have asked myself, could the fir-trees beneath which it grows have had anything to do with its presence in a wood in such plenty ? The woods, though full of fine trees, are not above a hundred years old ; and more than once have I been told since last May that such and such a one used to be an open heathy warren, similar to one now at Linwood near here, where the “ Reindeer Moss ” and an allied species (*C. aculeata*) grow plentifully, and where the *Cetraria* does not, so far as I have seen. My own question I have, so far, answered by a kind of mental compromise : that the *Cetraria* might have been brought in soil at the roots of

young fir-saplings, if such came from a nursery in Scotland or a mountainous part of the north of England; but in absence of proof positive as to that, the relic-of-an-interglacial-period theory must be held the most probable.

The question is an interesting one, and I am sorry to leave it thus, misty and unsettled: perhaps Dr. Parsons or others, who have thought out the matter, will not object to give their opinions upon it for the benefit, not merely of myself, but of all readers of the *Naturalist*. I see many reasons in favour of such a Symposium of Science as I suggest; and I certainly think that, from time to time, it would prove an attractive and instructive feature in any natural history journal without a great command of original articles. It would surely tempt an expression of opinion from many who shrink from attempting more didactic contributions.

Market-Rasen, Dec. 15th.

A COLLECTING EXPEDITION TO THE NEW FOREST.*

BY G. T. PORRITT, F.L.S.

So much has been said and written about the New Forest and its natural history, that I am pretty sure to be assailed (in thought if not in words) with a charge of plagiarism in again taking up your time with the subject. Constantly hearing of the rare things taken there, and of the glorious grandeur of the locality, I had for years felt a wish to visit the spot for myself, but it was not until the present year that my longing was gratified. Even after I had decided to go, one of my friends, who knew the Forest well, wrote me that I had better delay my visit for a year, as this was the worst season for lepidoptera ever experienced by the Forest collectors. Notwithstanding the warning, however, on the 30th July last I found myself *en route* for Hampshire, and about eight o'clock in the evening arrived at Lyndhurst-road Station. Here an omnibus was waiting to convey passengers to the village of Lyndhurst, where we arrived after a drive of three miles through what in the daytime and in a clear atmosphere would be most lovely forest scenery; but on this occasion it was getting dark, and the ground was covered with a dense mist, which was anything but agreeable as I sat on the outside of the 'bus. We were not long in reaching the "Crown," a respectable hotel situated near the Church,

* Paper read before the Huddersfield Scientific Club.

and where anyone wishing to stay in the village, would do well to "put up" at. I, however, was anxious to be as near the best collecting ground as possible, and so, on the recommendation of Mr. J. G. Ross, of Bath, had engaged rooms at Fern Cottage, on Clay Hill, about a mile out of Lyndhurst, and right upon as good collecting ground as is to be found in the Forest. To this place another conveyance speedily brought me, but it was quite dark when I reached my destination. Mrs. Burge, the hostess, soon made me very comfortable, and after having had a good tea I turned out to look for my companions, the Rev. T. W. Daltry, F.L.S., of Madeley, and two of his sons, who had preceded me, and who had gone out to "sugar." I soon perceived the glimmer of one of the lamps, and found they were returning from a fruitless hunt, the mist, or something else, having spoiled all chance of doing anything that night. We were soon in the house again, and sat up until midnight, talking over former expeditions, and all that had happened since our meeting at Abbotts' Wood last year, with all other blissful reminiscences only known to entomologists. Just before going to bed we turned out again, and stood listening for some time to the owls, which were making unearthly noises all around us : how long the hooting was kept up I cannot say, but I heard it until I fell fast asleep in bed.

Next morning was glorious—too hot to be comfortable, but just right for the game we hoped to find. We had decided to spend the day on the heath, so after breakfast at once set out. Passing through Jones' enclosure, immediately behind and only separated by a narrow field from our lodgings (and which enclosures, too, form some of the best collecting ground), we crossed the road and were immediately on one of the finest and most picturesque heaths I ever beheld. The broad extent of purple heather, interspersed with scattered but by no means small beech woods, with the various wood enclosures along the sides, and the one or two farm-houses on the edge, together with the fine spire of Lyndhurst Church towering above the trees, presented a picture not to be surpassed in beauty, and never to be forgotten by any of us. On leaving our lodgings the first butterfly we noticed, I believe, was the graceful *Limenitis Sibylla*, in anything but a lovely condition, however, as they were evidently almost over, and although plentiful enough, were in a wretchedly tattered condition. *Argynnis Paphia* was also at once noted in Jones' enclosure, and it was in good condition. We afterwards found this was the most abundant butterfly on the wing, some of the blackberry bushes being literally alive with it. On reaching the heath the pretty *Lycæna Egon* at once

attracted attention from its numbers, as it was flying in thousands all over the heath. *Colias Edusa* also scampered at a fine rate, and gave us some fine chases, for being in splendid condition we could not resist them. *Satyrus Semele* was common, with the other still commoner *Satyridae*, &c. Of moths, the very local *Selidosema plumaria* was most abundant, but unfortunately for the most part in bad condition ; we were, however, pleased to find a fair number of the female, which usually is much less frequently met with. *Pseudopterpnia cytisaria*, also, was very common about the whin bushes, on which we suspected the larva had fed, as there was none of the usual foodplant (broom) to be seen. Other species taken were—*Gnophos obscurata*, *Pachycnemia hippocastanaria*, *Eubolia palumbaria*, plenty of *Stenopteryx hybridalis*, *Crambus pascuellus*, *Waringtonellus*, *inquinatellus* with *pinetellus* and *selassellus* less commonly, &c., &c.

After some time on the heath, we turned into one of the beech-woods close by, and were at once struck with the grandeur of the trees, but more particularly with the long hairy lichens which everywhere covered their trunks and branches, even to the very tips. We afterwards found that these lichens formed one of the characteristics of the Forest, as all kinds of trees were perfectly laden with them ; the huge whitethorns being so densely covered that it seemed marvellous they were not perfectly choked, as indeed many of them evidently were. We were no longer surprised that the Forest harbours so many of the rarest lichen feeding lepidoptera. We did but little in the wood this day, however, and as all we did get we also took in a more extensive but somewhat similar wood on the following day, we will leave our account of them until we come to speak of it.

In the evening we went down to Hurst Hill, the great locality for the two crimson underwings which perhaps more than any other two species have made the New Forest so noted a collecting ground. Our first night was not very productive, but a few *Catacola promissa* were taken; hardly anything else visited the trees, a few *Amphipyra pyramidea*, *Cosmia trapezina*, with odd *Thyatira batis*, being about all. On following nights we were more successful with the *Catacolas*, indeed they became more plentiful as the days went by, and on some evenings we could take as many as 60 or 70. *Sponsa* was the more plentiful, but *Promissa* was also very common, and this year will no doubt be reckoned a splendid season for both these species ; many hundreds, perhaps thousands, must have been secured by the numerous collectors on the ground during the ten days I was there. Closely allied as the two species are, their habits are very different. *Sponsa* flies very early,

immediately the sun goes down, and it was necessary to have the sugar on the trees by 6-30 in broad daylight, to be in time for them ; and generally we took most before even lighting up the lamps. *Promissa* on the contrary comes much later, when it is quite dark, and instead of settling flat on the sugared patch with its wings closed, as *Sponsa* does, it rests with wings raised and partly spread, distinctly shewing the beautiful crimson lower wings. At first we netted the moths off the trees, but we soon discovered that this method would not do if we intended having fine specimens, as, being excessively wild when in the net, in five cases out of six the scales were completely rubbed off the thorax, leaving it perfectly bald before it could be got into the cyanide bottle. We found the only way was to bottle them straight off the trees, but this done, they were perfectly safe and in exquisite condition, as, big and strong though they are, the cyanide fumes overpower them immediately. Whilst sugaring for these species we had more than one illustration of the extreme jealousy that exists amongst some of the New Forest collectors, especially some of the dealing fraternity. They think that if they sugar a "ride" at the beginning of the season, they are at liberty to appropriate it the whole season afterwards. The first night or two we accidentally sugared the rides of some of these gentlemen, and a fine row they made about it when they appeared upon the scene. Sugarers became so numerous, that some of them actually walked nearly three miles to the place in the afternoons, day by day, to affix a card containing their names, to the first tree in the ride, to notify that such ride was "taken." This was quite a common occurrence.

Next day, changing our ground, we spent in Denny Wood, another favourite part with lepidopterists. Our object was chiefly to obtain the rare *Cleora glabraria*, a lichen feeder, and to achieve our purpose we set to work with a will beating the lichen-covered beeches, whitethorns, oaks, &c. It was tedious work however, as *glabraria* was scarce—very; and we only managed to secure two specimens that day, if I remember rightly. They were in nice condition, however, and perhaps we were rather too early for the species, as the local collectors were breeding it daily during the last few days I was there ; and I myself had three out after my return home. With them we beat out a few of the local *Lithosia quadra*, with *Ennomos angularia* in tolerable plenty, and *E. erosaria* less commonly ; we also beat down larvae of both these species from which imagos have since emerged. Other species taken were *Limacodes testudo*, *Liparis monacha*, *Cleora lichenaria*, *Ephyra trilinearia* (common), *Minoa euphorbiata*, *Platypteryx unguicula* (tolerably frequent in beeches), &c.

whilst amongst the undergrowth of bracken, &c., the peculiar *Endotricha flammealis* abounded. Of butterflies Bertram Daltry believed he saw *Apatura Iris*, but it was flying too high to be quite certain about it ; he had, however, seen the species on the wing more than once in Kent, so probably it was that species, especially as a few days afterwards we saw a fine female example alive in a collector's box taken in Stubby Copse.

(*To be continued.*)

NOTES ON THE NATURAL HISTORY OF BINGLEY.

By JAMES VARLEY.

ON April 2nd, 1877, I went to Bingley with part of my collection of natural history objects, to an exhibition which was held in the Mechanics' Institute, and was opened on the 3rd April by Benjamin Broadbent, Esq., president. I stayed all the time it was open as curator, and made a few notes of the place, and the natural productions in which it abounds.

The town is a thriving little place, the manufacture of worsted goods being the staple trade. The Midland railway runs through it, and it is situated on the left bank of the river Aire. There are some very ancient buildings in and about it, and on the south side many hillocks are thrown up, which an old inhabitant told me were old lime quarries, from which they have in former days got a kind of slate lime. There is a very nice people's park, which, from its high elevation above the town, and the romantic scenery around, may be made one of the finest in the kingdom. From here the river Aire may be traced winding its way for a great many miles.

One morning I had a walk to St. Ives, the seat of Wm. Ferrand Esq., and on my way I saw the following birds :—*Phasianus colchicus*, *Perdix cinerea*, *Columba palumbus*, and a great many of the genus *Turdus*, as *T. viscivorus*, *T. musicus*, and *T. merula*; *Fringilla cælebs*, *Coccothraustes chloris*, *Parus major*, *P. cæruleus*, *P. palustris*, and *P. caudatus*; *Accentor modularis*, &c. These woods also abound with game.

On the 12th April there was a very strong frost in the morning, and at the Druids' Altar I found ice one-eighth of an inch thick. I noted the following birds :—*Falco tinnunculus*, *Columba livia*, *Sturnus vulgaris*—all breeding in the rocks. I also saw *Turdus torquatus*, *Vanellus cristatus*, and *Sylvia trochilus*, the first spring migrant I had seen here, and it was in full song. On the 14th I went to the people's park, and saw the linnet, *Linota cannabina*; lesser redpole,

L. linaria; mountain linnet, *L. montium*; yellow bunting, *Emberiza citrinella*; pied wagtail, *Motacilla Yarrelli*; tree pipit, *Anthus arboreus*; meadow pipit, *A. pratensis*; and wheatear, *Saxicola ænanthe*.

One morning, whilst watching from my bedroom window a sparrow's nest at the top of a drop-spout on the opposite side of the street, there came a jackdaw and tried to dislodge the sparrow, but did not succeed, the sparrow staying in the nest till the jackdaw had gone away, and then came out in evident delight.

On April 18th I had a walk to Hallas Waterfall, Goitstock—a beautiful waterfall about two miles from Bingley, and well worth a visit. The day was very cold, and the little willow warblers sheltered themselves behind walls and searched in the crevices for insects. I saw the grey wagtail in spring dress, and a very large flock of starlings, which rose up like a cloud—a sure indication that cold weather is not over. At the Grange (the seat of Walter Dunlop, Esq.,) is an old ruin, which is covered with ivy, and is the habitation of owls, jackdaws, and rock doves.

During a walk to Shipley Glen—a fine romantic place—I only saw one more of the spring migrants, the redstart, *Phænicura ruficilla*, but very plentiful and in full song; also the magpie, *Pica caudata*, and jay, *Garrulus glandarius*. On the banks of the river Aire I noticed the water vole, *Arvicola riparia*, and water shrew, *Sorex fodiens*. The swallow was plentiful, hawking for flies. Returning by the Druids' Altar I saw the cuckoo, *Cuculus canorus*, but it was too cold for it to sing. On another occasion I saw a bird that I could not make out, but thought it must be the black redstart; the water-hen, *Gallinula chloropus*, a pair of the common sandpiper, *Totanus hypoleucus*, and kingfisher, *Alcedo isspida*, were also noted.

On April 30, a bright sunny morning, I again saw the bird that I could not previously make out, and found it to be the black redstart, *Phænicura tithys*, also the Ray's wagtail, *Motacilla Rayii*, and afterwards the whinchat, *Saxicola rubetra*, and whitethroat, *Currucina cinerea*.

On May 6th I started by the first train for Bellbusk, and then walked over to Malham Cove, and thence over the hills to Gordale Scar. This spot is very rich in botany, and whilst sat on the hill I had the pleasure of seeing a pair of buzzards, *Buteo vulgaris*, flying in circles over the Scar. Gordale Scar is a wonderful place. We descended to the bottom of the cliffs, a difficult passage in many places. In these cliffs are many small ferns and alpine plants. On our way down we found larvæ of *Chelonia plantaginis*, and saw a kestrel's nest on the opposite cliffs; with my field-glass I could see the

birds feed their young ones. On our way back we visited Jennet's Cave, where is a splendid waterfall, under which the dipper and grey wagtail breed in security.

At Beck Foot on May 9th I saw the following spring migrants :—*Curruca sylviella*, *C. atricapilla*, *Sylvia sylvicola*, and *Muscicapa grisola*. During a walk to Keighley I saw *Salicaria phragmitis*, *S. locustella*, *Emberiza schoeniclus*, and *Rallus aquaticus*, the latter breeding in the old water course where the river has been turned. On Rombolds Moor I noted the red grouse, *Lagopus scoticus*, and curlew, *Numenius arquata*; also a pair of wild ducks, *Anas Boschas*, *Cypselus apus*, and stonechat, *Saxicola rubicola*.

Almondbury Bank, August 10th, 1877.

Rainfall for December.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL. TO DATE.		Date of heaviest Fall.	Amount of heaviest fall.
				1877.	1876.		
Huddersfield (Dalton)..... (J. W. Robson.)	350	3·44	19	41·39	*32·95	30th	0·69
Wakefield ... (F. Hill)	120	2·37	17	33·19	+23·40	30th	0·81
Leeds ... (H. Crowther.) ...	183	2·61	14	34·91	...	30th	0·73
Halifax ... (F. G. S. Rawson)	360	5·40	19	61·73	51·14	...	...
Barnsley (T. Lister.) ...	350	2·29	19	34·17	32·28	30th	0·72
Ingbirchworth ... (Do.).....	853	4·05	24	50·84	45·79	30th	0·93
Wentworth Castle (Do.).....	600	3·42	16	40·48	...	30th	0·81
Goole... (H. F. Parsons.) ...	25	1·30	15	26·00	25·69	30th	0·42

* This is the average to date for 11 years, 1866-76.

† General average.

Huddersfield.—Mr. Robson remarks the number of rainy days in 1877 was 212, the average for 11 previous years being 187.

Wakefield.—Mr. Hill : Wet days, 203; excess of 9·79.

Halifax.—Mr. Rawson says, 191 rainy days were registered at Leeds, and 188 at Halifax, a very close comparison; and the rainfall at Bolton (Lanc.) was nearly the same as at Halifax, viz., 60·33.

Short Notes and Queries.

STONECHAT IN YORKSHIRE.—In the *Naturalist* for January I find that the editors give Huddersfield, Halifax, and hillsides about Diggle, as localities where the stonechat breeds. This is a mistake. The wheatear (*Sylvia oenanthe*) breeds in these localities, in stone heaps and old walls, which they evidently have mistaken for it. The stonechat (*Sylvia rubicola*) is only an accidental visitor here, and they are generally young birds. It frequents uncultivated places, the sides of cliffs, and sand hills by the sea. I have found it in Sherwood Forest and South Wales, plentifully breeding in grass and low herbage at the bottom of furze or other bushes. On May 21st, 1877, I saw a pair of stonechats on the moor at the top of Shipley Glen.—JAMES VARLEY, Almondbury Bank, Huddersfield, Jan. 15th.—[Mr. Varley is right. It was the *wheatear* we had in our mind when writing the note, and did not find out the mistake until too late. We are very sorry indeed the error has occurred.—G. T. P.]

KITE AT BINGLEY.—On the 7th September last a kite (*Falco milvus*) paid a flying visit to this neighbourhood. I was walking with a friend on the brow of the hill when it came wheeling past us. Its flight, which is an exquisite piece of "wingmanship," is effected in large sweeping circles, with outstretched and apparently motionless wings. I must confess, however, its light-coloured (in fact it seemed white) head somewhat puzzled me, but as its mode of flight is so distinctive I could not be mistaken. This once far-from-uncommon species in our island, has become, in these "degenerate" days, to be considered a great rarity.—E. P. P. BUTTERFIELD, Wilsden, 14th January.

"**THE MIDLAND NATURALIST.**"—We hail with pleasure the appearance of the first number of this journal as the medium of communication amongst the Naturalists of the Midland Counties, and the journal of the proceedings of those Societies. Formed after the plan of our own Union, we wish it every success, and hope that the members of the various societies in the Midland Counties will subscribe to it in large numbers. There are some useful papers in the first number, and from the well-known abilities of many members of the societies of the Midland Union, we look forward to its monthly appearance with interest and expected information.—EDS. NAT.

Reports of Societies.

BARNESLEY NATURALISTS' SOCIETY.—Monthly meeting, Jan. 7th, the president, Mr. T. Lister, in the chair.—A box of insects, taken near Hastings in late autumn by Mr. W. J. Cope and his sons, was exhibited, containing 45 fine specimens of *Colias Edusa*. Plentiful as they have been in Yorkshire, they were in richer abundance in Sussex. A few

notices of birds were brought before the meeting, snipes, magpies, jays, and kingfishers being reported. Our resident birds have never been noticed to sing so much as in the present autumn and winter. They ceased a while in moulting, but many—as the skylark, thrush, and wren—burst out again in melody, and our gardens near the town are enlivened up to the present date by the thrush, robin, and other songsters. On the 20th December the president saw in Walton Park large numbers of bernicle, brent, and Canada geese, wigeon, scaup, and wild ducks; they are wonderfully tame, being protected as in Waterton's home, and come to feed on the island in front of the hall. Mr. Hailstone wrote on the 12th that three wild swans flew northward, and 500 wild ducks, widgeons, and dun divers, were on the lake.—THOS. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting Jan. 8th.—Entomological, ornithological, and geological specimens were exhibited. Mr. Firth reported having heard the thrush in full song on Jan. 5th. Mr. Carter then read a list of the lepidoptera collected round about Bradford from the beginning of 1875 to the end of 1877, in which he enumerated 190 species, giving the localities and dates; amongst them were the following:—*Colias Edusa*, *Vanessa polychloros*, *V. cardui*, *Sphinx convolvuli*, *Nudaria mundana*, *Chelonia plantaginis*, *Arctia fuliginosa*, *Pericalia syringaria*, *Geometra papilionaria* (thirty specimens of this were taken in 1877), *Scodionia belgiaria*, *Abraxas ultima*, *Larentia cœsiata*, *L. olivata*, *Emmelesia affinitata*, *Eupithecia pulchellata*, *Melanthis rubiginata*, *Melanippe galiata*, *Coremia propugnata*, *Acronycta menyanthidis*, *Axylia putris*, *Caradrina alsines*, *Agrotis valligera*, *A. porphyrea*, *Triphaena fimbria*, *Noctua C-nigrum*, *Hadena glauca*, *Plusia V-aureum*, and *Stilbia anomala*. The members have recorded 457 plants for the district round the town, representing 245 genera and 68 orders, excluding mosses, scale mosses, fungi, and lichens. The following are some of the rarer plants: *Ranunculus fluitans*, *R. Lenormandi*, *Stellaria nemorum* (plentiful in several localities), *Geranium phænum*, *G. pyrenaicum*, *Acer campestre*, *Ulex Gallii*, *Trifolium procumbens*, *Prunus Padus*, *Sanguisorba officinalis*, *Rosa mollissima*, *Epilobium tetragonum*, *Fæniculum vulgare*, *Myrrhis odorata*, *Centaurea Calcitrapa*, *Senecio Saracenicus*, *Lactuca muralis*, *Campanula latifolia*, *Vaccinium Vitis-idaea*, *Lathræa squamaria*, *Orobanche major*, *Trientalis europaea*, *Carpinus betulus*, *Salix pentandra*, *Potamogeton densus*, *Sagittaria sagittifolia*, *Elodea canadensis* (everywhere), *Carex lærigata*, and *Alopecurus agrestis*.—WM. WEST, Sec.

CLAYTON-WEST NATURALISTS' SOCIETY.—Annual meeting and tea, 12th January, Dr. Duncan in the chair.—The annual report and treasurer's balance-sheet were read and passed, and the officers and committee for the ensuing year elected. The members present were highly gratified with the improved position of the Society, and expressed their satisfaction with the report, which showed an increase of members during the year, as well as a considerable cash balance in hand. The Society also

possesses a library containing upwards of 100 volumes in the various branches of natural history, together with a number of costly instruments for the use of the members.—WM. WAITE, Sec.

GOOLE SCIENTIFIC SOCIETY.—Meeting Jan. 2nd.—A paper was read by Dr. Blair on “Animal Parasites.” A number of microscopic slides were exhibited.—H. FRANKLIN PARSONS. [We hope to publish this paper shortly.—*Eds. Nat.*]

MEETING January 16th.—The following specimens were exhibited :—*Terebratula semiglobosa* (white chalk), Woolwich, by Mr. Bunker. (Dr. Parsons gave a short sketch of the Brachiopoda); *Syngnathus*, the pipe-fish, from the River Ouse, by Mr. Bunker; *Hydra vulgaris* (living) by Mr. Hunter; *Cordylophora lacustris*, with parasitic *Carchesium polypinum* from R. Ouse, Goole, by Dr. Parsons: (both Mr. Hunter and Dr. Parsons made some remarks upon the Hydrozoa); *Spongilla fluviatilis*, Selby Canal, by Dr. Parsons: *Cotyledon Umbilicus*, *Ceterach officinarum*, *Thamnium alopecurum* (fr.) and *Peziza coccinea* (in recent state), by Dr. Parsons—all from Somerset, where they are very common, although not found in this part of Yorkshire: microscopic slides by Rev. R. W. Maxwell.—H. F. PARSONS, Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting January 11th, Mr. G. T. Porritt, F.L.S., president, in the chair.—Mr. S. L. Mosley exhibited a fine collection of lepidoptera recently received from Switzerland; the box included, amongst many other species, *Melitaea merope*, *Hadena lateritia*, *Bombyx franconita*, *Pieris napi* var. *bryoniae*, *Selenia grammodes*, *Lithosia aurita*, *Zygona carniolica*, *Melitaea Pales*, and its var. *Isis*, &c. He also showed a magnificent series of coloured plates of exotic *Diurni*, executed by himself. These, from the masterly manner in which they were finished, created great interest. The president showed the first part of Owen Wilson’s “Larvæ of British Lepidoptera, and their Food Plants,” which had just been issued; it gave great satisfaction to the members. Mr. George Brook showed the following interesting objects with his microscope:—Enock’s new method of mounting insects entire without crushing, and thus shewing the muscular structure clearly: in illustration he showed the spider *Clubiana amarantha*; also *Spyrogyra nitida*, *Pedicillaria* of *Echinus sphæra*, and *Rotifera*. Mr. C. P. Hobkirk showed the following microscopical fungi:—*Peronospora infestans* (resting spores) *Aecidium Epilobii*, and *A. ranunculacearum*. He also shewed a postal box just issued by the Postal Microscopical Club, which was admitted by the members to be superior to any box previously out; it seemed almost impossible the slides could be broken in it when passing through the post. Mr. Geo. Brook called attention to the extraordinary fact that all the gases had now been liquified, and read the account of the recent marvellous results obtained from experiments with oxygen, hydrogen, and nitrogen.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Monthly (Jan.) meeting, Mr. S. J. Capper, president, in the chair.—The president drew attention to and shortly reviewed a new work on the larvæ of the British lepidoptera and their food-plants, by Owen J. Wilson, Esq., illustrated by life-size figures painted by Mrs. Wilson. A paper was communicated by Mr. E. Birchall, F.L.S., on “*Arctia lubricipeda*,” after which the meeting resolved itself into a conversazione.

SELBY NATURALISTS' SOCIETY.—Annual soiree, 17th Jan.—This was a most successful meeting, both in exhibits and attendance. The president, Mr. J. Atkinson, after a few introductory remarks, introduced the various gentlemen who had promised to address the meeting, amongst whom Dr. Gibson gave an address on “A piece of Flint—what does it mean?” Rev. J. Spink discoursed upon and exhibited Prof. Bell's Telephone, and Mr. Hunter, F.C.S., explained the theory of the Spectroscope, with some brilliant experiments. The exhibition consisted of four classes : I. The industrial products of the town ; II. Antiquity and works of art, &c. ; III. Natural History ; IV. Scientific instruments : the whole of which were well represented, but to particularise would require too much space, and to select would perhaps be invidious when all were good.

STAINLAND NATURALISTS' SOCIETY.—Ninth annual meeting and soiree, at Burwood, 7th January, the president in the chair.—Mr. Fakes shewed a female specimen of the merlin hawk, shot on Greetland Moor. Mr. W. H. Stott read the balance-sheet, which showed a number of new books added to the library, eleven new members enrolled during the year, and a small balance in hand—thus proving the Society to be in a progressive condition. Mr. Garside was re-elected president, Messrs. Smith and Calvert vice-presidents, and W. H. Stott secretary.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting, Jan. 9th, Mr. Wm. Chapman in the chair.—Mr. W. Simmons exhibited a box of *Coleophoræ* and cases in very fine order ; Mr. Ripley a fine specimen of the bittern (*Ardea stellaris*), shot at Castle Howard on Dec. 26th, also a specimen of the marsh harrier (*Falco rufus*), shot near Pocklington in September last ; Mr. Jackson some fine varieties of *Liparis dispar*, *Heliothis armigera*, *Lemiodes pulveralis*, a very dark *Liparis monacha*, *Sciaphila octomaculana*, and *Catoptria juliana* ; the hon. secretary, Mr. Prest, some fine specimens of *Cleora glabraria*, and the rare butterfly *Lycæna Acis*, taken in 1877 in Wales : *Meliana flammea*, *Tryphæna subsequा*, a specimen of the very rare *Pachnobia alpina*, taken in Scotland ; *Teniocampa gothicina*, and *Dianthæcia irregularis*. The secretary read a letter from M. A. B. Farn, of London, asking the Society to co-operate with the committee of the first Great National Entomological Exhibition, to be held during the present month in the Royal Westminster Aquarium, and after some discussion it was agreed by some of the members to be exhibitors.

Diary.—Meetings of Societies.

- Feb. 2. Mirfield Naturalists'—Paper : "Damascus to Lebanon."—Joseph Wainwright, F.L.S., of Wakefield.
,, 4. Leeds Geological Association, 8 p.m.—H. Crowther. Huddersfield Naturalists'—"Reasoning *versus* Non-reasoning Powers of Caterpillars."—S. D. Bairstow.
,, 5. Bradford Naturalists'—Paper on "Corals."—Wm. Jagger. Leeds Naturalists' Club, &c., 8 p.m. Leeds Conchological Society, 8-15 p.m. Bishop Auckland Naturalists' Club. Liversedge Naturalists' Society.
,, 7. Bradford Scientific Association.
,, 8. Huddersfield Scientific Club, 8 p.m.
,, 11. Huddersfield Literary and Scientific Society — Paper by Joseph Frost, 8 p.m.
,, 12. Leeds Naturalists' Club, &c.—Paper : "How to examine a Plant microscopically." (Part II.)—Hy. Pocklington, F.R.M.S.
,, 13. York and District Naturalists' Field Club.
,, 14. Bradford Scientific Association — Paper by Mr. E. Mirfield. Huddersfield Literary and Scientific Society—Paper : "The Nervous System of Insects."—J. S. Cameron, M.D., B.Sc.
,, 16. Huddersfield Naturalists'—"How to use the Microscope."—George Brook ter.
,, 18. Leeds Geological Association—Paper by Thomas Tate.
,, 19. Bradford Naturalists.
,, 21. Bradford Scientific Association—Paper : "Terrestrial Energy."—Thomas Tate. North Staffordshire Naturalists' Field Club—Meeting at Leek.
,, 25. Huddersfield Literary and Scientific Society—Paper by Henry Jefferson, M.A.
,, 27. Goole Scientific Society.
,, 28. Bradford Scientific Association—Paper by S. Tomlinson. Huddersfield Literary and Scientific Society (Microscopical Section)—"Legs and Feet of Insects."—C. P. Hobkirk.
-

Books, &c., RECEIVED.—*Scottish Naturalist* (Jan.), *Science Gossip* (Jan.), *Midland Naturalist* (Jan.), *American Journal of Microscopy* (Jan.).

COMMUNICATIONS RECEIVED, but deferred for want of space, from Charles Dixon, S. L. Mosley, F. A. Lees, F.L.S., Rev. W. Fowler, M.A., James W. Wood, Dr. Blair, &c.

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No. XXXII.

MARCH, 1878.

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Original Articles.

CONCHOLOGICAL NOTES: SWITZERLAND, 1877.*

By JAMES W. WOOD.

It is but little time a tourist can spare, from sight-seeing, for the more lowly occupation of shell-gathering. There are so many things "one must see,"—so many hills to climb, and so little time to climb them in—that it would seem that in this high-pressure age of ours we go at a faster rate through our pleasures and holidays than we even do in business. My notes are glimpses as I hastened on my way.

The Axenstrasse skirts the shore of Lake Lucerne amidst its finest scenery. I was leaning over the parapet wall on the lake side, looking at the glorious view, when something stuck to my hand; it was a *Pupa avena*. There are hundreds in the irregularities of the stone wall. I took out a chip-box and scraped them out with the box itself, until it was nearly full. The wall was hot and dry in the brilliant sunshine, and each shell was closely attached to the stone. In walking through the woods up to the Axenstein Hotel, I found *Helix nemoralis, fruticum, laticida, obvoluta, personata, incarnata, erectorum*, with *Clausilia laminata, rugosa, parvula, Pupa avena*, and *Pomatias maculatum*.

As you walk from Bex in the Rhine valley, to Grion by the salt works, the road passes through woods, and on the smooth-barked trees, but not on the rough ones, by the roadside are quantities of *Pomatius maculatum*, with a few *Pupa avena*. On the bare stone walls were quantities of this *Pupa* mixed with some *P. maculatum*. I also found *Helix fruticum* and *Clausilia laminata*.

The road from Interlaken to Lauterbrunnen, passing under huge precipices, and fringed with trees among which are scattered fallen masses of stone, is a "happy hunting ground." One mass of rock I found literally covered with *Helix rupestris*; I also found many *Helix villosa*, together with *incarnata, laticida, candidula, fruticum*; *Pomatias maculatum, Pupa avena, Bulimus montanus, obscurus*, and *Clausilia rugosa* and *parvula*. *Helix pomatia* and *nemoralis* are so generally distributed that I scarcely took any notice of them.

I should be inclined to think the Jura range of limestone a paradise for conchologists. As you ascend the Chaumont from Neuchatel, there are low limestone cliffs much eroded at the base, and under this

* Communicated and read before the "Conchological Society of Great Britain and Ireland."

cover is the "meeting of the clans," *Pupa avena* and *Clausilia rugosa* in hundreds: *Clausilia parvula*, *Pomatius maculatum*, *Helix lapicida* in numbers under the fallen stones by the wayside, *Helix hortensis*, *personata*, *obvoluta*, *incarnata*. Coming down by the carriage road we notice again on the smooth-barked beech and birch, quantities of *Clausilia rugosa* and *Pomatias maculatum*. These chiefly hold the first four feet of trunk from the ground, then comes *Clausilia laminata* and *rugosa* up to about six feet, and lastly *Bulimus montanus*. I scraped off the lower ones with a chip-box, picked off *Clausilia laminata*, and among them one *albida*, and also the *Bulimus* when I could reach them, but had generally to poke them off with my umbrella and catch them in my hat. I also saw *Helix candidula*, *Pupa avena*, *Bulimus obscurus*, and *H. villosa*.

I do not know if the natives in these parts are conchologists, but as I walked among the trees in the still summer evening, two peasants came along, and seeing a stranger examining the trees, they looked at some themselves, and of course they found some shells, which they carefully picked off and brought to me, and, with native politeness raising their caps, asked, but in a doubtful, wondering tone—"Does monsieur wish these?" "Thanks—good night." "Good night, monsieur"; and they evidently made up their minds that they had seen another "mad Englishman"; and perhaps as they went home through the dark, silent woods, they crossed themselves and hoped it was *only* a mad Englishman they had seen.

I cannot imagine a more enjoyable trip than one taken for a few weeks in Switzerland by a small party of field naturalists. The flowers are lovely, the insects everywhere, if one only had the power of getting over the ground that *Acridium viridissima* has; the rocks and strata are maddening, and shells are plentiful. Perhaps in the far future it may be a reproach to any one to pass through the beauties of Nature without attempting to pry into some of her secrets.

Northampton, 24th Nov., 1877.

ALPINE PLANTS ON LOWLAND HEATHS.

By H. F. PARSONS, M.D.

I THANK Dr. Lees for the compliment he pays me in asking for my opinion, but I rather wonder at his inviting me to join in a *symposium*, which, if I remember rightly, is Greek for a *drinking bout*.

The occurrence of mountain plants on sandy heaths, and woods in the plains, although by the terms of the case not a common pheno-

menon, is nevertheless not an unprecedented one, although I do not remember any instance of plants so characteristically alpine as *Lycopodium alpinum* and *Cetraria islandica* having been so found. For example, two allies of the latter plant, *Cetraria aculeata* and *Platysma glaucum*, whose usual habitat is mountain rocks, grow on Riccall Common—a low-lying sandy heath between Selby and York; *Racomitrium lanuginosum*, an abundant and characteristic moss of mountain districts, grows sometimes on heaths in the plains, as in Norfolk (Hooker, Engl., Fl., pt. 5, vol. 1), and, as I am informed, at Strensall Common, near York.

The occurrence of plants in outlying stations at a distance from the territory usually inhabited by them, may be explained in two ways—either by supposing them to be intruders, introduced by some means into the situation which they now occupy, or by looking upon them as stragglers left behind in the general retreat, and able to hold their ground under favourable circumstances against the invading host of new species brought in by a change in physical conditions. Which explanation are we to accept in the present case? I think, with Dr. Lees, the second. It is one of the advantages which the *Cryptogamia* afford to the student of geographical botany, that with them he may usually dismiss from his mind the supposition of their being artificially introduced by man's agency into the stations where he finds them. Of natural agencies by which they might have been introduced, there is one which at first sight looks not improbable: could they have been brought on boulders transported by ice from the mountain districts of the north of England and Scotland? Alpine species of mosses are known to occur on the boulders derived from the Scandinavian mountains, which lie scattered about over the level plains of North Germany. I do not think, however, that this is the explanation. In the vale of York at any rate there is this difficulty—that the boulder clay is separated from the surface of the soil on which the mountain plants grow by a considerable thickness of newer strata, gravel, laminated clay (in some places nearly 60ft. thick), and sand; it is upon the sand, or a bed of peat above it, that the plants of which I have spoken grow. The boulder clay, however, comes to the surface within a few miles, but it is not very likely that seeds or spores would retain their vitality after so long a submersion and lapse of time as the intermediate strata indicate to have taken place.

The explanation which I should offer is, that these plants formerly extended over an area wider than that which they now occupy, but that, under altered physical and climatic conditions, they have been

dispossessed by the influx of new species, except from places such as barren sandy heaths and mountains, where their physiological constitution gives them an advantage over the invaders.

If we think of the plants that are common to lowland districts and to mountains, we shall find that, with the exception of sturdy species which can get a living anywhere (*e.g.* the daisy), the great majority are plants which in the lowlands are found chiefly or only on sandy, often wet heaths. As examples I may give *Galium saxatile*, *Erica tetralix*, *E. cinerea*, *Calluna vulgaris*, *Vaccinium Myrtillus*, *Pinguicula vulgaris*, *Narthecium ossifragum*, *Juncus squarrosus*, *Carex flava*, *Aira flexuosa*, *Nardus stricta*, *Molinia caerulea*, *Nephrodium Oreopteris*, the *Lycopodia*, the sundews, &c., with many mosses and lichens. The conditions favourable to the plants which sandy heaths possess in common with mountains, appear to be—plenty of fresh air; an atmosphere free from smoke and other impurities derived from human habitations; humidity; and above all, the absence of undue competition of other plants, particularly of the grasses and others which form the herbage of our pastures, and of the common weeds of cultivated ground. A barren soil, and the cold of great elevations, have a similar effect in preventing the growth of these competing species. Cold favors arctic and alpine plants, not so much directly as indirectly; and it is not that they cannot grow without cold, but that they *can* stand cold, and other plants *can not*. It is stated that in Switzerland no plants are found above the snow-line which do not also extend below it; and, on the other hand, many alpine flowers thrive well on our English rockworks, where the watchful eye of the gardener protects them from the weeds which would otherwise spring up and choke them.

HINTS TO YORKSHIRE ENTOMOLOGISTS.

By S. L. MOSLEY.

Now that our Union has placed us upon a firmer basis, I should like every member to throw his hands right heartily into the work, and let us see what the county is worth from a Natural History point of view. There are a few things that require doing, which have been neglected both here and in almost every other part of Britain. To be brief, we want workers in *Diptera*. This is a much neglected order, the probable cause being that there are so few workers that it is difficult to get help, and the insects themselves are less gaudy and

attractive than the lepidoptera, to which all young entomologists seem to flock. I intend, during the coming year, to pay special attention to the *Diptera* of Yorkshire, and I should be very pleased either to give or receive help in this line. When entomologists come across anything unusual, it would be an easy matter to run a pin through the insect, and label as to locality (when there is a lot from one locality it will be sufficient to label the box), and I should always be very glad to send insects of other orders in return.

Hemiptera seems, in our county, almost a dead letter. How interesting must this class of insects be, not only entomologically but botanically—but alas ! how despised ! While lepidoptera are almost choked with students (or collectors), I know of no Yorkshire Hemipterist since the death of Mr. Wilkinson.

I hope that, during the coming excursions of the Union, I may meet with some persons who are proud of being collectors of bugs ; I intend to make acquaintance with a portion—the *Psyllidæ* at least. Then there is the order *Hymenoptera* ; more workers are required in it, and especially in the Ichneumonidæ and saw-flies. Our secretary (Mr. Roebuck) would, I am sure, be very pleased to give any help he can ; and it must be very gratifying to him to learn that others have promised to take up portions. Lepidopterists could help very materially in the ichneumon flies if they would take care of the specimens they breed ; these should have notes attached to the pin as to the species from which they were bred ; in fact, nothing should be done without notes. We want to know more of Yorkshire gall insects, and there is plenty of room here for those who are only naturalists because they pay a yearly subscription to some society. Drones ought to be worried at the year end with a pricking consciousness that they have done no work.

Neuroptera ought to receive more attention than it does. I have seen some very beautiful specimens in Yorkshire, and we ought to have someone somewhere who could tell us what all these are. Another division is the *Orthoptera*, including the grasshoppers, cock-roaches, &c. ; and as bulk is not taken into consideration by scientific men, somebody should “do” the *Thysanura*, *Columbola*, and other branches of the apterous orders of insects.

Then comes that great family just outside the insect world—the spiders. These require special attention. I have collected a few Yorkshire species, but we want some of our members to make a *study* of them. The great obstacle to this class is that there is at present no known satisfactory method of preserving them. That of keeping

them in spirits (four parts methylated spirit to one of water) seems to be the best known, and I have found that one difficulty may be overcome by inserting white cotton wadding behind the specimens, and so forcing them against the front side of the tube. Another capital thing would be to make a series of well-executed coloured drawings of the specimens while alive, as the colours change after they have been in spirits some time.

What is wanted is some member in each local society to take up one of these divisions, and at the meetings of the Union compare notes and specimens, and hold "family consultations." Or if the lepidopterists would take up some division or a portion of a division, and work it out, in addition to the lepidoptera, the work of the Union would get on much better. Entomologists who have sons and daughters of a sufficient age should encourage them to strike out in new lines of investigation ; if this is not done, it generally happens that the children, finding the lepidoptera so exhausted, and having no encouragement to go beyond, all interest is lost, and at the death of the father the collection has to be sold.

Primrose Hill, Huddersfield.

NOTES ON THE BIRDS OF BINGLEY.

BY E. P. P. BUTTERFIELD.

IN the *Naturalist* for February last, Mr. Varley introduces to your readers a few "Notes on the Natural History of Bingley." As the subject is of special interest to me, having "worked" the district which covers his field of observations, as far as my limited opportunities would allow, a few additional remarks may not be unacceptable to your readers. In the first place, he met with the willow warbler in full song on the 12th April ; this date coincides with its arrival in this neighbourhood, but it is, however, singular that we did not hear its song until the 19th. The grey wagtail breeds almost annually in the Goit Stock valley near the waterfall ; so does the dipper and the kingfisher. Starlings are to be met with in flocks, more or less, throughout summer, and would make it not improbable that some of the young at least may not breed until their second year. It is not the rockdove, but the ringdove, which breeds at the old ruins near the seat of Walter Dunlop, Esq. The nearest place where the stockdove breeds is in the Goit Stock valley. The jay has almost become extinct by the relentless persecution to which it is

subjected by the gamekeepers ; also the magpie bids fair in a few years to be placed in the same category if this efficient system of *espionage* goes on. The black redstart is a valuable addition to our local ovifauna, but its value depends on its being properly authenticated. Has Mr. Varley any doubt as to the identity of the species in question ? For May 9th, he must have been particularly fortunate in his observations of some of our rarest birds. I have never met with either the grasshopper warbler or the water-rail in this district, but an old friend, on whose ornithological knowledge I can rely, tells me he has seen one specimen of each species. The curlew breeds not uncommonly on Rombalds Moor—a fact which I have not hitherto seen mentioned ; it also breeds plentifully on Barden Moor, and it would seem to be extending its range to the southward. With regard to the stonechat I am thoroughly convinced it is not so commonly distributed as supposed, and is often confounded both with the wheatear and whinchat. The chiffchaff and the golden-crested wren are conspicuous by their absence—a circumstance all the more remarkable when we consider that the physical character of the country is apparently so suited to their habits. Of late years the tree pipit and the yellow wood-wren have increased in numbers, whilst on the other hand, the brown linnet has diminished, owing, no doubt, to its haunts having been brought under cultivation. Mealy redpolls are to be met with in large flocks this winter, over birch copes. It is a very irregular winter visitor.

Wilsden, Bingley, Feb. 9th, 1878.

A COLLECTING EXPEDITION TO THE NEW FOREST.

BY G. T. PORRITT, F.L.S.

(Concluded.)

Gonepteryx rhamni was very plentiful in the rides, and in splendid condition ; *Colias Edusa* also again occurred in similar situations. *Argynnис Papia* swarmed everywhere, and several of the black form of the female, var. *Valezina* were seen, one fresh lovely specimen being secured by Mr. Daltry. *A. Adippe* was not unfrequent, and I fancy *Aglaia* also, although I did not set them to make certain. *Satyrus Egeria*, *Tithonus*, *Janira*, and *Hyperanthus* were in good force, and *Hesperia Sylvanus* and *Linea* were common, but worn.

I have now given a tolerable idea of our work ; day by day we spent in this manner in various woods or on the heaths, taking

generally the same species again, but frequently dropping on something fresh. The following list will show pretty correctly the result, and though it is very poor, it is perhaps as good as anyone did in the Forest at the time, this season, which has undoubtedly been an excessively bad one. I omit the species already mentioned, and some universally common ones :—*Leucophasia sinapis* (second brood just appearing), *Vanessa Polychloros*, *Atalanta*, and *cardui*, *Chortobius Pamphilus*, *Thecla quercus*, *Lycæna Alexis*, *Nola cuculatella*, *Calligenia miniata*, *Lithosia helveola*, *Liparis auriflava*, *Bombyx quercus*, *Odonestes potatoria*, *Selenia illunaria* (second brood), *Hemithea thymiaria*, *Ephyra pendularia*, *Acidalia bisetata* and *promutata*, *Ligdia adustata*, *Larentia pectinitaria*, *Eupithecia nanata*, *Melanthis procellata*, *Thyatira derasa*, *Bryophila perla*, *Cerigo cytherea*, *Aplecta nebulosa*, *Anarta myrtilli*, *Erastria fuscula*, *Aglossa pinguinalis*, *Pyraustra purpuralis*, *Hydrocampus nymphæalis*, *Botys verticalis*, *Ebulea crocealis*, *Scopula ferrugalis*, *Pempelia palumbella*, *Melia sociella*, *Pterophorus pentadactylus*, *Alucita polydactyla*, &c., &c. We had hoped to get the local *Tryphæna subsequa*, but did not see a specimen ; some half-dozen, however, were secured by more fortunate collectors during our stay.

Mr. Daltry and his sons left several days before I did, but I was joined on the 8th of August by Mr. J. G. Ross, of Bathampton, near Bath ; and together we had a larva hunt. We had tried beating several times before, but it was so unprofitable that we gave it up ; and our success this day was no better. The larvæ taken amongst us included *Lithosia aureola* from the lichen-covered branches, rather commonly, along with another pretty dark *Lithosia* we did not recognise. From the leaves we beat out a few of the beautiful larvæ of the equally beautiful imago, *Diphtheria Orion* ; also *Orgyia pudibunda*, *Ennomos angularia* and *erosaria*, *Ephyra punctarea* and *trilinearia* (?), *Notodonta dromedarius* and *dodonæa*, and a number of others. The striking caterpillars of *Euchelia Jacobæa* were in great profusion on the ragwort plants along the stream, just before entering Denny Wood ; and those of *Bombyx rubi* and *Acronycta rumicis* were also noticed. Bad as the season was, some species had been taken in plenty earlier. *Zygæna meliloti* we were told had occurred in immense numbers, and larvæ of *Cymatophora ridens* had abounded on nearly every oak.

Before bringing this paper to a close, perhaps it will be as well to say a few words about the other natural productions of the Forest, followed by a few remarks on its general aspect. What I write on these subjects must necessarily be very limited, as I am not well

acquainted with either one or the other. The botany is very varied, and doubtless includes many rare plants, but these I do not recognise when I see them. We noticed the pretty ivy-leaved bell flower, *Wahlenbergia hederacea* in some plenty, in one spot; and *Anagallis tenella* was abundant.

Of birds, the hobby, honey-buzzard, and Montagu's harrier all breed in the Forest, though the second mentioned is now becoming very rare. On Sunday afternoon, after I had returned from church, two men brought me a most beautiful young sparrow-hawk, just at that stage of plumage when it looks prettiest. One of them had climbed up to the nest in a tree, but before reaching it the young ones had jumped or flown out; they had managed, however, to secure this one alive. They evidently thought I should buy it from them, but this I declined, as I did not care to kill small birds as food for it, and moreover had no wish to encourage Sunday birds'-nesting. The tawny owl is very abundant, and the long-eared one breeds not uncommonly, whilst the short-eared species occurs on the heaths in winter. The nightingale is common; and the rare Dartford warbler occurs, occasionally building in the thick furze bushes on the open heaths. Gold crests are about the firs, and three woodpeckers—the green, spotted, and lesser spotted—are pretty generally distributed, as is also the nuthatch. Herons are common, but unfortunately decreasing, and black game are said still to occur. Two hundred species are reported as occurring in the Forest, and of these 74 are residents.

Of reptiles the viper is very abundant, both on the open heaths and in the rides of the woods. We frequently saw a boy with his arm in a sling, through the bite of one of them. The vipers vary much in colour, too, some of them being nearly as black as coal, with hardly any trace of the usual markings. We did not notice this form ourselves, but Mr. Tugwell, of Greenwich, saw some when he was there. The common ringed snake is also as common, I was told afterwards, but did not notice it apart from the viper. One day we picked up a very fine slow-worm, and no doubt it is plentiful enough.

Of the lepidoptera we have said sufficient, so will very briefly glance at some of the other orders. Coleoptera are abundant, and the largest representative of the order, the stag-beetle, was repeatedly found on the palings, or in the road, in front of our cottage; and another nearly as large, but a different species, was also picked up. In the sun the beautiful polished green rose beetles were common on the flower heads of *Heracleum Sphondylium*, or plants of that kind. Neuroptera abounded, and I was very much pleased with the variety

and beauty of the dragon-flies, which were hawking in great numbers over all the many marshy places so numerous on the heaths. A respectable collection might have been netted from some of these marshes. Dipterous insects were in great profusion, and some of them very speedily made known their presence ; he would be a thick-skinned individual indeed who could go through a hot sunny day collecting without thinking, if not using, strong language at these blood-thirsty brutes.

Altogether the general aspect of the Forest presents rather the appearance of an immense park than of a dense wood, the idea we are apt to associate with the name. Good roads run through it in every direction, and even in the thickest and best woods there is no difficulty in getting about, as is so often the case in our woods, owing to the thick underwood. The open character of the woods is said to be due to the former browsing of the commoners' cattle on the brambles and other undergrowth. It is a fact, too, that one of the chief characteristics of the New Forest is that it presents less wooded than open land. Another peculiarity is the way in which it is parcelled out into "enclosures," that is, many of the woods are enclosed all round with palings, and these enclosures seem frequently named from the keepers who look after them—thus, Fletcher's enclosure, Broadley's enclosure, Jones' enclosure, &c. As near as can be ascertained, the extent of the Forest is, from east to west fifteen miles, and from north-west to south-east twenty miles, embracing some 91,000 acres.

This concludes my paper ; one equally long might be written on the intensely interesting historical associations of the Forest, but this would be rather out of the province of a Natural History Club.

Huddersfield, Oct. 11th, 1877.

Short Notes and Queries.

YORKSHIRE MOSES.—Dr. Wesley has sent us specimens of *Didymodon luridus*, *D. cylindricus*, *Trichostomum tophaceum*, and some others recently gathered by him near Wetherby ; also *Hypnum cuspidatum* var. which appears to be very close to var. *B. pungens*, Schimp., and to which it may possibly be referred. As pointed out, however, by Dr. Braithwaite and Mr. H. Boswell, to whom specimens have been submitted, it differs in not having "*ramulis circinnatis,....fol. ram. omnibus arcte convolutis.*"

Rainfall for January.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1878.	1877.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 3·09	19	3·09	* 3·26	30	0·69
WAKEFIELD ... (F. Hill).....	120	2·34	16	2·34	1·80	3	0·64
LEEDS ... (H. Crowther) ...	183	2·50	18	2·50	...	3	0·53
HALIFAX... (F. G. S. Rawson)	360	5·40	24	5·40	...	...	...
BRADFORD... (J. A. Douglas, [F.M.S.]	...	3·54	20	3·54	4·65	22	0·75
BARNESLEY ... (T. Lister) ...	350	2·20	19	2·20	3·82	3	0·32
INGBIRCHWORTH (do.)	853	3·54	20	3·54	5·62	21	0·86
WENTWORTH CASTLE (do.)...	600	2·48	19	2·48	4·72	21	0·51
GOOLE ... (H. F. Parsons) ...	25	1·04	15	1·04	2·10	3	0·25

* This is the average to date for 12 years, 1866-77.

Elodea canadensis.—Will Dr. Lees, or any other explanator of distribution tell the readers of the Naturalist how *Elodea canadensis* spreads into ponds, &c., far removed from any canal or river on which boats are found? I have noticed it in ponds at a good elevation. One instance of its occurrence a good distance from an easy source of contamination is between Meanwood and Adel, a place familiar to Dr. Lees.—W. WEST, Bradford, Feb. 7th, 1878.

STONECHAT.—I was surprised to read a note in the current *Naturalist* by Mr. Varley, stating that the stonechat does not breed in the neighbourhood of Halifax, Huddersfield, or Saddleworth—that is to say, on the Pennine moors. Mr. Rawson, in his “Birds of Halifax,” says explicitly that it *does* breed in his neighbourhood. Mr. Talbot says that it breeds in the Wakefield district, stating where he has found its nest. Mr. Roebuck gives Adel Moor as a nesting-place in the Leeds district; and Mr. Lister enters it as a spring visitor to the Barnsley district. Mr. Miali gives it as a bird frequenting the barren lands about Bradford. I have seen it occasionally here in spring, and Mr. Varley himself declares that he observed it on Rombalds Moor in the breeding season on two occasions last year. Bearing in mind this testimony, and considering the nature of the bird, I should think it a singular feature in the ornithology of Britain if it does not breed annually, though perhaps not abundantly, all along the western moors—a region far more in consonance with the habits of the bird than some of the places above adduced. I should like to have the opinions of others on the subject. In the meantime Mr. Varley may be justly invited to give us a little more information in

substantiation of the negative position he has placed himself in. A few more details respecting the habits and distribution of this bird, as observed by Mr. Varley in connection with his assertion that it does not breed in a certain moorland district, would doubtless be interesting to many readers of the *Naturalist*.—GEORGE ROBERTS, Lofthouse, Wakefield, Feb. 5th.

A SCIENCE LESSON IN SELF-HELP.

The first number of a second volume of an instructive literary venture—"THE NATURAL HISTORY JOURNAL"—conducted by the Societies in Friends' Schools, lies before me. Everyone ought to wish it success, not merely because evincing the decided impulse given of late to the encouragement of science-study in our schools (a matter in which the Friends have ever been pioneers); but on account of the honest and clearly-reliable character of the records sent in from the various amalgamated Societies, whose copious monthly notes fill, for the most part, eight pages of small type. The observations embrace astronomy, botany, meteorology, and ornithology. Space will not allow of quotation, but I must say that the page and a half of botanical items, if kept up with the same regularity for the nine years to come as they have been for the last twelve months, sent as they are from so many wide-apart localities, could not fail to result in an array of facts whose value, as a basis for generalisation, could hardly be over-estimated. Moreover, from a statement in the opening address may be gathered the fact that this journal has been self-supporting during its first year of life. Above 170 contributors, 63 of them boys and girls (intelligent beyond the average, possibly), have enriched the first volume; over 600 copies of each issue have been sold, and a balance carried over towards the printer's bill in 1878. Think of that! But a journal whose internal resources are so great, whose working subscribers are so numerous, could hardly fail of the success it deserves. And therein is a lesson in self-help to our Yorkshire societies they would do well to heed. Why does not every member of our Naturalists' Union make it not merely a matter of duty to subscribe to his Union's journal, but also a matter of conscience to send up, for publication in that journal, each month one genuine observation of *his own*? All could, if they tried, do that—it is easier than many fancy, for ungarnered facts in the storehouse of Nature lie around us everywhere—but they don't! If they could but see it, the loss is not alone that of their fellows. How easy, and in the result how profitable, to begin to-morrow a systematic series of questions in regard to every stone, every plant, every bird, &c., they see, asking first themselves and then others, and last this journal, if they cannot find out else—What's your name? How do you come to be where I found you? By what means, from where? And lastly: Now you are here, how do you manage to live, if this isn't your original abode? A series of questions which I fancy I have seen somewhere suggested by the late Charles Kingsley, though I

forget the place. No matter, if they are old their appropriateness never can be. And this reminds me our journal has a column for "Notes and Queries," but I never see any queries! I wish I did; surely the contributors form a staff able and willing at any rate to try and answer them. I fear the questioning spirit, so strong in childhood, does not always, even among naturalists, continue in manhood. Let us all seek, in the coming spring of young life and the fruition of later summer, to arouse anew, in ourselves and in others, our too-dormant enthusiasm for God as seen in His works.—F. A. L.

Reports of Societies.

BARNSLEY NATURALISTS' SOCIETY.—Meeting Feb. 5th, the president, Mr. T. Lister, in the chair. Mr. A. Kell showed a sketch prepared by him of the ground to be applied for from F. V. Wentworth, Esq., for a museum. Meanwhile until improved trade aids the scheme, rooms are to be applied for to the Public Hall Company, for meetings and an exhibition. The observations of birds since last meeting may be briefly stated. Jan. 24, a water-rail obtained from a neighbouring pool; scarce here, not seen for many years. A velvet scoter was brought to Mr. Z. Schofield, a young male bird of full size. Jan. 31, a few herons haunted Blacker Dam, Silkstone. One was unfortunately shot by a keeper. Feb. 2, the great speckled woodpecker noted. Feb. 7, Mr. Wemyss writes of the occurrence of the gold-crested wren, bramblings, bullfinches, chaffinches of both sexes. Starlings, stormcocks, and redwings singing in chorus at Cannon Hall, were also noted.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting Jan. 22nd, the president in the chair.—Some geological specimens were exhibited, amongst which was a piece of limestone which was one mass of encrinal remains, &c. It must have been in glacial drift, for it was found whilst excavating at Manningham. Mr. Andrews was the exhibitor. Amongst the other objects were: *Blatta Americana*, shown by Mr. Crowther, who had found it in a case of imported grapes: *P. pilosaria*, taken on Jan. 17th, at Shipley by Mr. Saville: and some American plants exhibited by Mr. West. Mr. Jagger delivered a lecture on "Coral," setting forth the very great influence that this polype exercises on the physical geography of some parts of the world, as well as the record of time it had built up.

MEETING, Feb. 5th, the president in the chair.—Objects exhibited: by Mr. Crowther, a horse-shoe crab, found in a barrel of American oysters; Mr. Gee, *Hybernia leucophaearia*, taken at Shipley Feb. 3rd; Mr. West, living specimens of *Hydra viridis*, the habits, &c., of which he explained; Mr. Jagger, all the British butterflies but *L. acis*, some moths, and a large number of fossils, amongst which were the following: *Terebratula obovata*, *Patella rugosa*, *Fusus contrarius*, *Plagiostoma spinosa*, *Holaster subglobosa*, *Rhynchonella tetrahedra*, and *Spongia ramosa*.—WM. WEST, Sec.

CLAYTON-WEST NATURALISTS' SOCIETY.—Meeting, 13th February : Lecture by J. Wainwright, Esq., F.L.S. ; subject, "Damascus to Lebanon."—W. WAITE, Sec.

CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.—This Society still continues to do good work. Its collections have been enriched by the gift by one of its members (Mr. R. Scharff, Bradford) of a valuable series of land shells, collected by the donor in Germany last summer, also by the president and Mr. J. W. Taylor of land and freshwater shells. The exhibitions have been principally confined to fossil and recent shells, and but few papers have been read ; but one on a new species of *Planorbis* (*P. Gibbonsii*), and the introductory address of the president delivered on Jan. 15th, were of special interest. In the latter, after dwelling upon the beauties which conchology opens out to us, were reviewed the motives of the Society, the uses to which it, as a co-operation, is being put, in forming lists of shells and working out their distribution. Taking Dr. Jeffrey's work as his text-book, he proceeded to show how many, out of the 126 British species might occur in Yorkshire, and by interesting deductions placed it at 115 ; of these 86 have been gathered and placed on record by the Club. The districts—which have been examined pretty well—and the workers upon them, were next touched upon : these are our own as far as Wetherby in a north-easterly direction, Wakefield including West-vale, Huddersfield and Wensleydale, &c.—H. CROWTHER, Secretary.

GOOLE SCIENTIFIC SOCIETY.—Meeting Jan. 31st.—A paper was read by the Rev. R. D. Maxwell, on "Mollusca." The author spoke of the land and fresh-water mollusks, especially the bivalves. Taking *Unio pictorum* as an example, he gave an interesting description of the anatomy of the shell and soft parts, and of its life history. The principal other British fresh-water bivalves were briefly treated. He exhibited a list of the British land and fresh-water mollusca, in which he had marked the species found in this neighbourhood. 140 species were enumerated, of which 67 had been found living near Goole. The lecture was illustrated by diagrams, and by a large number of shells, living specimens, and microscopic slides.—H. F. PARSONS, Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting February 8th, Mr. G. T. Porritt, F.L.S., president, in the chair.—Mr. S. L. Mosley showed a beautiful series of coloured plates, painted by himself, of varieties of British lepidoptera. The plates of *Polyommatus phlaeas*, *Arctia caja*, and *Abraxas grossulariata* were especially splendid. The president showed specimens of *Acidalia degeneraria*, *Tryphæna subsequa*, *Crambus dumetellus*, *Homæosoma sinuella*, *Phycis subornatella*, and *Galleria cerella*, recently received from various localities. Mr. John Conacher showed the mounted palate of *Cyclostoma elegans*, from a Wetherby specimen ; Mr. Mosley, a European grass covered with dead specimens of a minute

shell in a most extraordinary manner. The grass had formed the "stuffing" of a bird's skin he had recently received. The rest of the meeting was spent in discussion and conversation on various topics.

HUDDERSFIELD NATURALISTS' SOCIETY.—Meeting Jan. 7th : Opening address by the president, Mr. Wm. Nettleton. Jan. 19, conversational meeting. Feb. 4, Mr. S. D. Bairstow read a paper on "The Reasoning *versus* Non-reasoning Powers in Caterpillars." Feb. 16, Mr. Geo. Brook ter. gave a very instructive lesson on mounting objects for the microscope. He hoped members would go into this branch of study, as it was both interesting and instructive.—S. L. MOSLEY, Hon. Sec.

LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—Entomological Section.—At the close of 1877 a number of entomologists formed a section for the more systematic study of this science (in the broadest sense), for the writing of a list of the insects of the borough of Leeds, and the collection of information with regard to the entomology of Yorkshire in general, not however forgetting that of Britain and the world at large. The section began its scientific work with the year 1878, and has met almost weekly, taking up at each meeting a certain number of species and working them out as far as possible. The names of the specimens exhibited are entered in books specially ruled for the purpose, with tabular columns for localities and other information. Mr. W. H. Taylor is president, Messrs. John Grassham and Charles Smethurst vice-presidents, and the secretaries are Messrs. Wm. D. Roebuck (*pro tem.*) and G. Tyers. At the first meeting Mr. Smethurst read a paper, in which he advocated the thorough study of the life-history of insects, and the mounting of microscopic preparations illustrating their structure and various stages. In the paper he also made observations as to cannibal larvæ, and an instance of protective resemblance in the young larva of *Acronycta alni*, which much resembles a bird's dropping. He was beating for larvæ at Bishop's Wood, near Selby, when he saw it in his umbrella, and after having tried to tap it off and failing, he examined it more closely, and then saw that it was a larva. A letter from Mr. Edwin Birchall, F.L.S., giving a list for Leeds, was read at the same meeting ; Mr. Smethurst also mentioned with regard to the yellow ichneumon-fly affecting *D. vinula*, that one stinging him in the arm produced a pain which lasted for some weeks after. Much information was given as to the range of *Colias Edusa* in Yorkshire during 1877, and its partiality for moist places. As an instance of this, at Selby it was to be met with in plenty on the river banks, but nowhere else. Beautiful varieties of *Argynnис Selene* (Bishop's Wood, Mr. Smethurst), *Vanessa urticæ* (Bishop's Wood, Mr. H. Marsh, and Adel, Mr. Smethurst), *Melitæa Artemis* (bred by Mr. W. G. Smith), *Polyommatus phlœas* and *Lycæna Alexis* (Mr. Smethurst) and others, were exhibited at various meetings. The secretary (Mr. Tyers) exhibited a specimen of *Catacola nupta* taken by him at Scarboro' in August, 1876. Other orders were also represented—hyber-

nating females of *Bombus hircorum* from Horsforth, and *Vespa sylvestris* from Meanwood ; specimens of *Metopius dentatus* bred from *B. callunæ*, taken on Rombalds Moor by Mr. Alfred Denny ; *Sirex gigas*, *Bombus terrestris*, and *Vespa germanica* from Lichfield by Mr. W. Barwel Turner, being also shown.—G. TYERS, Sec.

SELBY NATURALISTS' SOCIETY.—At a meeting on February 5th, the Rev. H. J. Fry, F.R.G.S., gave a lecture on “Modern Discoveries in Astronomy.” The points chiefly dwelt upon were the spots on the sun, Mars and his moons, the asteroids, Saturn and his rings, the meteors and shooting stars, the fixed stars, and the nebulæ.

WAKEFIELD NATURALISTS' SOCIETY.—Meeting January 3rd, in New Rooms, Queen-street, the president in the chair.—The officers for the ensuing year were elected, the president being Mr. J. Wainwright, F.L.S. ; vice-presidents, Messrs. W. Talbot and J. Wilcock ; financial secretary, Mr. H. Sims ; and a committee of six. The appointment of corresponding secretary was left over until next meeting. Mr. Wilcock gave notice of his intention to propose some new rules, a copy of which was read. Mr. Fogg presented to the Society four cases of moths, containing 260 specimens, towards forming a museum ; he also offered, as a challenge, nine cases of birds equivalent to £10, if twenty members would give an equal amount individually in twelve months.

MONTHLY MEETING, Feb. 7th, Mr. Wilcock, v.p., in the chair.—Mr. Spurling read the report for the past year, which showed the Society was progressing favourably, with a balance in treasurer's hands of £7 5s. 4d. Mr. J. W. Shaw was elected corresponding secretary. Mr. Wilcock's new rules were adopted ; one of them was that the Society should meet twice a month. Mr. Geo. Beverley presented to the Society “Balfour's Class-Book of Botany.” Mr. Fogg exhibited *P. pilosaria*, caught on the 21st of last month ; he also presented a wood pigeon and blue rockdove. Mast. Hall presented golden-crested wren, tree-creeper, and fifteen species of birds' eggs.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Meeting Feb. 13th, Mr. S. M. Lambert in the chair.—Mr. J. Harrison, of Wilstrop Hall, brought for inspection a very large and fine collection of bird-skins, mostly birds of prey ; amongst them were the imperial eagle, *Aquila imperialis*, the golden eagle, *A. fulvus*, the spotted eagle, *A. naevia*, and the white-tailed eagle, *A. albicilla* ; also *Pandion halictetus*, *Falco Greenlandicus*, *F. Icelandicus*, *F. laniarius*, *F. cenchris*, *F. subbuteo*, *F. rufipes*, *Milvus regalis*, *Pernis apivorus*, *Buteo vulgaris*, *B. lagopus*, *Circus rufus*, *C. cyaneus*, *Bubo maximus*, *Strix nivea*, *S. Scops*, *Bombycilla garrulus*, and *Regulus ignicapillus* ; the secretary, Mr. Prest, a case of finely-mounted coleoptera. The secretary was requested to attend the forthcoming Entomological Exhibition in London, on behalf of the Society, and to look after the interests of the members exhibiting there.—W. PREST, Hon. Sec.

Diary.—Meetings of Societies.

- Mar. 4. Leeds Geological Association.—“Remarks on some Coal-measure Fossils.”—W. H. Gill. Huddersfield Naturalists’.—“Exotic Butterflies.”—S. L. Mosley.
- „ 5. Bishop Auckland Naturalists’ Club. Liversedge Naturalists’.
- „ 7. Bradford Scientific Association.
- „ 8. Huddersfield Scientific Club.—Paper: “Legs of Insects.”—C. P. Hobkirk.
- „ 13. Goole Scientific Society—Papers by Messrs. Bunker and Birks. York and District Naturalists’ Field Club.
- „ 14. Bradford Scientific Association—“Anatomy of the Cuttlefish.”—W. Cash, F.G.S.
- „ 16. Huddersfield Naturalists’.
- „ 18. Leeds Geological Association.
- „ 21. North Staffordshire Naturalists’ Field Club—Annual Meeting at Stoke. Bradford Scientific Association — “Qualitative Analysis.”—J. A. Douglas, F.M.S.
- „ 27. Goole Scientific Club—Paper: “Flowerless Plants, and their Habitats.”—H. Franklin Parsons, M.D.
- „ 28. Bradford Scientific Association—“Physical forces which have caused the present configuration of the Aire valley.”—J. W. Davis, F.L.S., F.G.S.
-

BOOKS, &c., RECEIVED.—*Science Gossip* (Feb.), *Midland Naturalist* (Feb.), *American Journal of Microscopy* (Feb.), *Natural History Journal* (Feb.).

COMMUNICATIONS RECEIVED, but deferred for want of space, from W. E. Sharpe, B. B. Le Tall, S. D. Bairstow, Herbert Goss, F.L.S., &c.

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Original Articles.

LINCOLNSHIRE COAST PLANTS.

BY THE REV. W. FOWLER, M.A.

WERE we to make a pilgrimage round the coast of Great Britain, we should in all probability come to the conclusion, that the Lincolnshire portion thereof was in most respects less inviting than any other. No one but a naturalist cares to investigate muddy flats and barren sand-hills, or to walk for miles at the foot of sloping banks, artificially made for the purpose of protecting the land behind them from being overflowed by the sea. Anything more dreary to a lover of fine scenery can hardly be imagined; and from Grimsby to the border of Norfolk there is nothing else to be seen. Sometimes the sandhills form the principal features, at others the banks and mud-flats, but with this exception every mile, so far as scenery is concerned, is like every other. To the lover of nature, however, no part of the coast is without interest, and I therefore hope that the readers of the *Naturalist* will be glad to learn something of the flora of a county of which Mr. James Britten has said, "There is probably no county of similar extent of which so little is known, botanically, as that of Lincoln." (Paper on the Botany of Lincolnshire, in White's Directory for 1872.) With the exception of a few miles north of Skegness, the whole of the Lincolnshire coast has, at one time or another, been visited by the writer, and few plants reported in Mr. Britten's list as growing there, have not been seen by him. These are *Statice Caspia*, *Spartina stricta*, *Crambe maritima*, *Silene maritima*, *Sagina maritima*, *Lathyrus maritimus*, *Phleum arenarium*, *Ranunculus hirsutus*, *Rumex maritimus*, and *Ruppia spiralis*. All, however (except perhaps the last, for which Babington gives "salt marshes in the south,") are likely enough to occur. *Statice Caspia* is said to grow at Frieston, and no doubt does, a specimen having been sent to me by Mr. Blow, from Hunstanton, in Norfolk, at the opposite side of the Wash. *Silene maritima* was seen near Cleethorpes by Dr. Lees in 1870, but it cannot be plentiful on the coast, or it would not have escaped me.

Having said thus much by way of preface, I will now give the results of my own observations, dividing my list into two sections—mud lovers and sand-lovers—and leaving it to be understood that, except when localities are given, the plants are common all along the coast.

I.—MUD-FLAT PLANTS.

<i>Cochlearia officinalis</i> , south of Wainfleet	<i>Chenopodium rubrum</i> . Salt- fleetby
<i>C. anglica</i> , do.	<i>Atriplex littoralis</i>
N. S., VOL. III., APR., 1878.	

<i>Spergularia marginata</i> (Sy.)	A. Babingtonii
<i>S. neglecta</i> (Sy.)	A. arenaria. Saltfleetby
<i>Enanthe Lachenalii</i> (Gmel.)	<i>Triglochin maritimum</i>
Saltfleet	<i>Juncus maritimus.</i> Saltfleet.
<i>Aster Tripolium</i>	<i>Juncus Gerardi</i>
<i>Artemisia maritima</i>	<i>Blysmus rufus.</i> Saltfleet and Humberstone
<i>Glaux maritima</i>	<i>Scirpus maritimus</i>
<i>Armeria maritima</i>	<i>Carex distans.</i> Saltfleet and Humberstone
<i>Statice Limonium</i>	C. extensa. do.
<i>S. occidentalis</i> (Lloyd). Salt- fleet and Humberstone)	<i>Sclerochloa maritima</i>
<i>Plantago maritima</i>	<i>S. distans</i>
<i>Suœda maritima</i>	<i>Lepturus filiformis</i>
<i>Salicornia herbacea</i>	
<i>Obione portulacoides</i>	

II.—SAND-HILL PLANTS.

<i>Thalictrum minus</i> (var. mariti- mum). Saltfleetby and Thed- dlethorpe	<i>Convolvulus Soldanella</i>
<i>Cakile maritima</i>	<i>Cynoglossum officinale.</i> Salt- fleetby.
<i>Honckeneja peploides.</i> Salt- fleetby	<i>Salsola Kali.</i>
<i>Trifolium scabrum.</i> Humber- stone	<i>Hippophæ rhamnoides.</i> Douna Nook, Saltfleet to Mable- thorpe
<i>Rubus cæsius</i>	<i>Carex arenaria</i>
<i>Eryngium maritimum.</i> Salt- fleet and Humberstone	<i>Psamma arenaria</i>
<i>Carlina vulgaris</i>	<i>Festuca arundinacea</i>
<i>Erigeron acre.</i> Saltfleetby	<i>Triticum repens</i>
<i>Lactuca virosa.</i> do.	<i>T. pungens</i>
	<i>Elymus arenarius</i>
	<i>Hordeum maritimum</i>

In addition to these it may be well to mention a few plants which I have observed in ditches and in fields near the coast.

<i>Ranunculus cæspitosus</i> (Thuill.)	<i>Potamogeton scorpiarius</i> (Syme)
Wainfleet	<i>Petroselinum sativum.</i> Wain- fleet
<i>R. Baudotii</i> (Godr.) Skegness	<i>P. segetum.</i> Saltfleetby.
<i>R. marinus</i> (Fr.) Great Coates	<i>Bupleurum tenuissimum.</i> On sea-bank between Wainfleet and Boston
<i>Althæa officinalis.</i> nr. Fos- dyke	
<i>Apium graveolens</i>	
<i>Samolus Valerandi.</i> Saltfleetby	

About the sea-banks and sand-hills, *Torilis nodosa*, *Daucus Carota*, *Carduus nutans*, and *Orchis pyramidalis* occur plentifully, the last-named plant apparently more vigorous on sandy than on limestone soil, where it is usually found.

Most of the plants on my list are probably to be found on all coasts at all resembling that of Lincolnshire, but there are a few to which, for one reason or another, it may be well to direct attention.

Statice occidentalis (Lloyd). Babington gives as its habitat "rocky shores," but it seems to flourish, along with *S. Limonium* (though much more sparingly) on the muddy shores of Lincolnshire; and Mr. Blow informs me that in his experience it has not been at all confined to "rocky shores."

Blysmus rufus. Not apparently recorded before, except from the northern and western coasts. It is plentiful enough about Humberstone, and between there and Cleethorpes.

Hippophae rhamnoides. Abundant for several miles on the sand-hills about Saltfleetby.

Althaea officinalis. Recorded in Topographical Botany for north Lincoln, but not for south. I never saw it in north, where I have lived for many years; but last year, after I had crossed the Witham, and made for the sea-shore, I saw it by ditch-sides in abundance.

Bupleurum tenuissimum. Plentiful between Wainfleet and Boston, at the foot of the sea-bank, but not noticed by me elsewhere. In precisely similar situations south of the Witham I was unable to find it.

Cochlearia officinalis and *C. anglica*. Never observed by me north of Wainfleet, though common enough on both sides of the Wash.

Petroselinum sativum. Apparently well established in fields between Wainfleet and Boston.

Petroselinum segetum. A decidedly rare plant in Lincolnshire.

It would not be without interest to follow these maritime and sub-maritime plants along the banks of the rivers Humber and Trent (as Dr. Parsons has followed them along the banks of the Ouse). Some observations have been already made by me with this object in view, and when I have completed them, I shall be glad to supplement this paper by giving the results obtained.

Liversedge Vicarage,
Yorkshire.

A FEW REMARKS ON PROTECTIVE INSTINCT.

BY CHARLES DIXON.

“Safety depends on vigilance.”

A PERSON frequently in the haunts of the feathered tribes during the nesting season, will not fail to observe the numerous artifices these creatures practise for the safety of their nests, eggs, or young ; and though these little artifices are often of a varied nature, yet but one end is in view, and that the preservation of their treasure. But, it is naturally asked, what is the *cause* of these peculiar motions, and what prompts the birds to practise them ? Instinct, not imitation, explains fully the cause, and instinct again explains the prompting power. If imitation was the theory on which they worked, all birds would practise these powers in the same manner peculiar to their respective species. But this is not so, for many, if not all birds, at some period of their existence, are called upon to exert their powers in a manner befitting, and harmonising with, surrounding circumstances. Can we, therefore, explain this power by anything save a protective instinct ?—an instinct which is as infallible as the Almighty Power which causes the creature to manifest it ?

I intend dividing this peculiar instinct into six divisions, and will take them in the following order :—firstly, colour ; secondly, mimicry ; thirdly, silence ; fourthly, alluring motions ; fifthly, pugnacious motions ; and sixthly, deceptive motions.

Colour.—If we wish to observe examples of this peculiar instinct, we must stroll into the nesting grounds of the pheasant, for instance, and there we shall find that the female bird, with a mother's watchful care, upon leaving her charge for a short time to recruit her failing strength with necessary food, covers her eggs with pieces of vegetation strictly harmonising with the colour of the herbage around. Thus, if her nest,—or cavity, for a nest it can scarcely be called—in which her eggs are deposited, is situated amongst a tangled mass of bracken, the bird will cover her eggs with the same material. Should her eggs be snugly ensconced in the shelter of a tuft of grass, materials harmonising in colour will be used to cover them during her temporary absence. When the bird is upon her charge, her own plumage so closely resembles the surroundings, that, trusting in these for safety, she remains faithful to it, until perhaps unwittingly trodden upon by an intruder. Again, the sand grouse are striking instances of this peculiar form of instinct. Their colours so harmonise with those of the arid waste on which they live, that when the

birds are sitting upon their eggs, discovery is almost impossible. The red grouse, when sitting, so closely resembles the moorland vegetation around, that the finding of her treasure is due more to accident than design ; and well does the parent bird know in what direction safety lies, and unerringly does she adhere to it. The terns and most shore birds, impelled by the same protective instinct, deposit their eggs only upon those portions of the beach which display the same tints as they do. In this manner numerous instances might be brought forth as examples, but, as I have previously stated, the remarks upon this somewhat lengthy subject must of necessity be somewhat brief. We will now, therefore, glance at the next division.

Mimicry.—This peculiar form of instinct is closely allied to the preceding one, and if it were not for a few incidents peculiar only to this division, it would be difficult to distinguish more than a slight difference between them. One of the first birds gifted with this instinct is the gay little chaffinch. Observe how closely she imitates the surroundings in the structure of her nest, how beautifully it is silvered over with lichen, or if on the rugged bark of a tree covered with similar material. If in the centre of a glossy evergreen, lichens are discarded, and bright shining green moss substituted in their place. If in the centre of a hawthorn, bedecked with fair and beautiful flowers, protective instinct impels her to gild her handiwork with small scraps of paper, so that, to a casual eye, the whole structure, imitating as it does the flowers around, appears a tangled mass of bloom. How artfully does the water ouzel imitate the colour of surrounding objects, her nest being invariably placed near a running stream, amongst the brightest moss, composed of similar material ; the dampness of the situation keeping them in all their verdant beauty, and thus concealing the nest of the bird, whose protective instinct lies in utilising them for her purpose. The beautiful nest of the long-tailed titmouse is again an instance of this protective instinct, and so is that of the wren. The robin also finds safety under its banner, and the delicately formed gold crest assimilates her nest to surrounding circumstances by weaving the branches of the fir amongst moss of the same colour, the whole appearing to a careless eye nothing but a mass of foliage. And then how beautifully do the sombre greens of the little dunnock's nest contrast with the colours of the vernal year, around. In all these cases how artfully and well, the little architects use to the best advantage, those materials which their unerring instinct leads them to make use of for the welfare of their young.

Silence.—Perhaps many persons will scarcely comprehend this peculiar form of instinct, yet such a form does undoubtedly exist, and that too in many of our commonest birds. Take, for instance, the little willow warbler, and note carefully how she leaves her temporary home. Her nest being often ill-concealed, silence is her *forte*, and well does she practise it. Observe the garrulous little whitethroat leave her nest, so silently threading her way from her treasure—so silently as to be seldom heard; and then, when at a safe distance from the neighbourhood of her abode, how joyously she gives forth notes of seeming defiance and alarm. How often does the silent protective instinct of the Dartford warbler manifest itself, the bird, when scared from its nest, leaving it silently, and going for a considerable distance under the surrounding vegetation ere it appears, by its silent motions thus leading an inexperienced intruder far away from her treasured home. Again, how silently the bunting leaves her charge, and what a deceptive little creature is the grasshopper warbler. I have often been deceived by their silent motions when in the neighbourhood of their nest. Silence, again, is the protective instinct of many of the thrushes, many of them remaining faithful to their charge until compelled to leave it, and then as silently as possible. But should the bird find her nest discovered quite accidentally, as many are, her instinct is not put in force, and the faithful parent flies quickly off and anxiously watches the movements of the aggressor from her perching-place near at hand. I have known many of these birds allow themselves to be touched by the hand, and remain silent, trying to the utmost their peculiar protective instinct for the welfare of their treasured eggs or young. The pipits, again, employ silence for the safety of their nests, the nest being almost buried in the herbage around, and the watchful bird remaining silently upon her charge, observing with anxious eye the motions of the intruder till he retreats from her “castle,” or perhaps almost treads upon the devoted parent and her house; when forced reluctantly to leave it, she does so as quietly as possible, and in most if not all cases this silent protective instinct is crowned with success and safety. If these birds were not gifted with this peculiar instinct, and left their nests in a precipitate manner, numbers of their eggs or young would be destroyed, which, however, through its agency, are brought up to maturity under its protective influences.

Alluring motions.—I consider this peculiar form of protective instinct one of the most beautiful evidences of an All-wise Providence. Where is the naturalist who, when he sees a bird

practising its varied motions, does not admire the little actor, and, if possessed of any feeling, leave her victorious, to attend to her domestic cares in peace? Although all these protective motions claim admiration from a lover of animated nature, yet the power now under notice is perhaps most readily manifest to a casual observer.

Let us stroll down this sandy shore. Observe yon little sandpiper which has just started up from our feet, endeavouring to make us concentrate all our attention upon herself; fearlessly she reels and tumbles before us, while her mate from yonder group of rocks is encouraging her with notes of condolence. Why is she so anxious? Her treasured eggs are on the sandy shore, and the little sand-bird is trying to the utmost those powers which an All-wise Providence leads her to manifest for the safety of her one and all-absorbing care. Now we will repair to the barren waste; here the lap-wing, driven by resistless impulse, will flutter with seemingly broken wings, now tumbling, now running, uttering her mournful cries, but in all these motions the watchful bird is endeavouring to lead us from her home on this dreary moor. Why is she so anxious? Disregard the motions of the watchful mother, and we shall probably find, after a scrutinising search, her eggs on some slight eminence, or her little ones nestling closely in the friendly shelter of the scanty herbage. The young themselves, even at this early age, manifest no slight degree of instinct for their self-preservation. These alluring motions are not confined to the female alone, for her mate, in another direction, is performing various aerial gyrations which would lead an inexperienced person to believe that the bird is circling over those treasures it is seeking to defend by so many artful and varied antics.

Pugnacious motions.—These motions form one of the most decided and marked of all the divisions. With man, they almost if not entirely fail, but against their *natural* enemies this peculiar power is of effectual service. As a homely type of this protective instinct we will take the missel-thrush. How admirably she defends her treasure from all predaceous animals, flying at them with such fury as to compel them to beat a hasty retreat from the neighbourhood of her home. Such is the impelling power of this instinct, that the birds, with only the safety of their nests in view, will attack, and come off victorious, even when matched against that little tyrant the sparrow-hawk. Notice yon magpie coming suspiciously near the nest of the missel-thrush—bent upon plunder, it is evident. How craftily he approaches! Ah! the watchful parent missel-thrush has descried him, and with a note of defiance which echoes through the silent woods,

she chases the intruder ; her mate, too, on hearing her cries, appears upon the scene, and aids in repelling the would-be robber. The magpie, crestfallen enough at the failure of his designs, is glad to beat a hasty retreat, and is no doubt thankful if he escapes with only the loss of a few feathers. The ring-ousel employs the same power for the protection of its nest, eggs, or young, and will even dash fearlessly into the face of a human intruder, uttering cries of mingled rage, defiance, anxiety, and alarm, should he approach her treasured nest and its priceless contents. Birds of prey also come under this division, and will even attack man himself when their nests are approached. Instances are on record where the human aggressor came off second best in these encounters. The raven, and others of the crow family, find safety under this peculiar instinct, and woe betide the predaceous animal that is caught lurking in the neighbourhood of their abode. The titmice are also included, and will, by hissing, biting, and other pugnacious actions, endeavour to repel the intruder from their eggs or young.

Deceptive motions.—The last division on which my remarks will bear, is of frequent occurrence amongst the feathered tribes. Prominent amongst its followers is the lark. Note how deceptively she repairs to her nest, by darting suddenly downwards into the herbage at some distance from it, proceeding the remainder of the way by running, thus baffling the searcher in discovering her abode. What a roundabout way the whinchat repairs to her nest, occasionally darting downwards into the thick grass. Surely that is the situation of the nest. But no ! up flies the little bird, and, perched on some tall stem of herbage, looks warily around, and again silently alights in the friendly cover. “ Found at last,” is our exclamation, and we rush hastily to the spot, but are somewhat crestfallen to find no nest, and even no bird. How is this ? Her protective instinct has been at work. Influenced by its unerring power, she has used these deceptive motions in regaining her nest, which is doubtless many yards away from the place of her final descent into the friendly cover. Then again, the rails manifest various deceptive motions in retiring from and regaining their nests. Who, also, has not observed wonderful instances of this protective power in the manner the starling approaches her abode ? In places where these birds are left unmolested no such power appears, but when the birds are far from the busy hum of cities, how warily they approach, and will not betray their nesting-hole even if thereby prevented from visiting their nest. Our eyes are often diverted from the bird for a few moments, and the

bird taking advantage of this circumstance, silently enters the nesting cavity. These are a few instances of this peculiar instinct, but a careful observer will see in the habits of these feathered creatures innumerable instances of this and the other forms of protective instinct.

From these remarks we may gain the following facts :—Birds depositing their eggs on bare situations invariably use alluring motions as a protective power ; by those nesting in dense situations, silence is employed ; predaceous birds as a rule employ pugnacious motions ; deceptive motions are displayed by birds whose nests are but little concealed ; while birds of a general habitat resort to colour and mimicry.

It must also be remembered that birds only display their protective wiles under certain circumstances, and these circumstances exist when the birds see ample scope for the utilising of them. Thus, if a sandpiper, rudely scared from her eggs, sees the intruder bending over them, she will not put in force her protective instinct, perceiving at once that the employment of it is vain, and she will utter a note of anguish and despair, and fly to a short distance to watch the motions of the intruder. This also clearly proves that no imitating power exists within them, for if this were so, birds would always employ these powers, and under all circumstances. Many birds are also known to possess *several* of these forms of instinct, and to use them as the emergencies of the case require. Thus the lapwing, or snipe, will manifest a silent protective instinct in some cases, while in others alluring motions will be adopted. Therefore I have no hesitation in saying that all birds have doubtless been gifted with equal portions of this peculiar instinct, and could, if circumstances required it, put in force all their varied arts, but have, through the course of endless time, adopted those motions best suited to their wants and conditions of life.

Thus has Nature bountifully supplied these feathered creatures with instinct sufficient to baffle, in most cases, their natural enemies—instinct which is so artfully put in force as to baffle even man himself, gifted as he is with noble, reasoning powers, which enable him to be the superior and master of every other living creature.

Heeley, near Sheffield.

Short Notes and Queries.

Elodea canadensis.—I can confirm Mr. West's observation of the occurrence of this plant in isolated ponds, although I cannot offer any explanation. Two instances especially occur to my mind : one is the

Hampstead ponds, near London, celebrated for the researches of Samuel Pickwick, Esq., of the Pickwick Club ; the other instance is a pond near Weymouth, on the road to Portland. This pond is on a promontory surrounded on three sides by arms of the sea, and with no navigable river within perhaps 20 to 30 miles. The difficulty of the problem consists in the fact that *Elodea canadensis* does not produce seed in England, as only the female plant is found here, but propagates itself by broken fragments of the stem which must be conveyed from place to place in the moist state. *Elodea canadensis* is a good illustration of the difficulty of defining a word, about the meaning of which most people would think there could be no doubt, viz., an "individual." If, with Owen, we consider every organism capable of maintaining an independent existence to be an "individual," then every joint of the stem of *Elodea canadensis* is an individual, since it is capable of becoming a separate self-sustaining plant. If on the other hand, with Huxley, we define an "individual" as the whole genetic product of a single fertilized ovum, then all the plants of *Elodea canadensis* which have ever grown in England together constitute but a single "individual," or at most only so many individuals as there have been separate introductions.—H. FRANKLIN PARSONS, M.D.

STONECHAT.—In reply to Mr. Roberts, of Wakefield, with regard to the stonechat, I am aware that it breeds at Wakefield, as the only one I have in my collection was shot by Mr. Parkin there, where he also found its nest. I still maintain that it is only an accidental visitor here. I have worked this district and the moors above Halifax right up to Wadsworth, and above Hebden Bridge as far as the ridge, and never found it till last spring, at the top of Shipley Glen ; and strange to say, I had a male bird brought to me on the 10th of this month, shot on the 5th on Dalton Bank, within a mile from where I live.—JAS. VARLEY, Almondbury Bank, March 14th.—[Mr. Varley should certainly have given some more cogent reason than a bare assertion.—*Eds. Nat.*]

STONECHAT NEAR BRADFORD.—On the 26th Dec., a male specimen of the stonechat was shot whilst flying over the fields about Bradford Moor. It is now in the possession of Mr. Edward Beaumont.—J. W. CARTER, Manningham, Bradford, March 16th.

GRASSHOPPER WARBLER NEAR BINGLEY.—Mr. Butterfield, in his "Notes on the Birds of Bingley," says that he has not observed the grasshopper warbler in that locality. I have been more fortunate than Mr. Butterfield. On July 22nd, last year, whilst walking over the moor to Ilkley, with two friends, we heard its curious note on Baildon Moor, about noon, and on our return journey we again heard its long monotonous note on the edge of Rombalds Moor, near Bingley.—J. W. CARTER.

YORKSHIRE MOSSES.—*Hypnum giganteum*.—Dr. Wesley is an indefatigable collector ; he now sends us a specimen of *Hypnum giganteum*, Schpr., discovered by him growing in bogs and rills near the "Cow and

Calf Rocks," above Ilkley, in February. This moss, says Dr. Wesley, seems to have been overlooked by Mr. J. G. Baker, F.L.S., as it is not named in his description of this spot in his "Flora of North Yorkshire," p. 79. There can be no question of this moss being quite distinct from *H. cordifolium* (and not a variety of it, as has been suggested by a correspondent to Dr. Wesley), the former being dioicous, and the latter monoicous—C. P. H.

Rhynchostegium murale var. β *complanatum*.—Rev. W. Fowler, M.A., Vicar of Liversedge, sends us a Moss which appears to be the above. It was found by him in January, on an old wall at Hightown, and bears several ripe capsules. It differs from the type in having a long creeping stem, less densely branched, with spreading branches, leaves sub-complanate smaller and very concave. We believe this is the first record for the county.—C. P. H.

Rainfall for February.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1878.	1877.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	350	0·99	11	4·09	* 2·63	14	0·33
WAKEFIELD ... (F. Hill).....	120	0·87	10	3·21	...	14	0·34
LEEDS ... (H. Crowther) ...	183	1·80	8	4·30	...	15	0·30
HALIFAX... (F. G. S. Rawson)	360	2·00	11	7·40	13.49	...	...
BRADFORD... (J. A. Douglas, [F.M.S.]	415	1·14	...	5·79	7·25	13	0·40
BARNESLEY ... (T. Lister) ...	350	1·08	8	3·28	6·18	14	0·38
INGBIRCHWORTH (do.)	853	1·51	14	5·05	9·16	12	0·32
WENTWORTH CASTLE (do.)...	600	1·31	9	3·79	7·14	14	0·54
GOOLE ... (H. F. Parsons) ...	25	0·89	11	1·93	3·92	14	0·32

* This is the average to date for 12 years, 1866-77.

Reports of Societies.

BARNESLEY NATURALISTS' SOCIETY.—Annual Meeting, Feb. 12th.—The officers were elected, and the balance-sheet, showing a favourable state of the finances was passed. The dates of flowers observed were—*Tussilago Farfara*, Feb. 16; *Cardamine hirsuta*, Feb. 27; *Thlaspi Bursa-pastoris*; *Corylus avellana* (female flower), March 3; *Ranunculus ficaria*, *Anemone nemorosa*, March 9; *Viola odorata*, March 11. The observations of resident songsters and rare birds were varied and interesting:—Feb. 7, gold-crested wren, bramblings yet numerous, bullfinches, chaffinches (both

male and female), and redwings are again reported by Mr. C. Wemyss, Cannon Hall. As the redwing singing in England is doubted, we vouch for it from personal experience. Feb. 11, blackbird, song noted ; 13th, common wild geese, flying southward ; 17th, chaffinch and blue tit, in song ; 18th, wigeons on the Dearne; starlings, larks, peewits, &c., passing ; 21st, a hawk as large as the rough-legged buzzard on the Dearne Dec., 1876, has hovered about same place several days, species not yet proved : many snipes seen. 23rd, eight common gulls flew over Barnsley to west ; Mar. 15, yellowhammer in song ; 16th, robin's nest and young.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting Feb. 19th, the president in the chair.—Mr. Firth reported having taken *Anisopteryx oesularia*, on Feb. 17th. Mr. Lorimer shewed *Hybernia rupicapraria*, an insect new to the district, taken in Shipley Glen ; *H. leucophearia*, and several other moths were exhibited. Mr. West read a paper on the plants of Bradford and district, to the end of *Umbelliferae*. The president exhibited four of Johnson's maps, illustrating the structure and the parts of plants.

MEETING March 5th, Mr. Firth in the chair.—Many of the early flowering wild plants were shown in flower, including *Lathraea squamaria*, *Myrrhis odorata*, *Chrysplenium oppositifolium*, and *C. alternifolium*. *Cymatophora floricornis* was shown, having been taken on March 2nd. Mr. Spencer exhibited a pair of dippers (*Turdus cinclus*). Geological specimens from the coal measures, and a stoat which had been shot at Clapham, were shown by Mr. Hebblethwaite ; the stoat shewed the transition from its winter to its summer coat. The secretary exhibited forty specimens of British ranunculaceous plants.—W. WEST, Sec.

CLAYTON-WEST NATURALISTS' SOCIETY.—Meeting March 2nd : Lecture on Physiology and Health," by the Rev. C. T. Pratt, of Cawthorne.

GOOLE SCIENTIFIC SOCIETY.—Meeting for exhibition of specimens and conversation, Feb. 13th.—The specimens exhibited included *Achatina acicula* (new to district) and a collection of palates of mollusca by the Rev. R. D. Maxwell ; and fossils, geological slides, and rock specimens, by various members.

MEETING Feb. 27th.—The secretary announced that it had been decided to take steps for the formation of a local museum as soon as sufficient funds had been raised for the purchase of the necessary furniture. Mr. Birks, as recorder for botany, read a paper on "The Flora of the Goole district." The Goole district—the area within a radius of twenty miles of Goole—presented a great diversity of natural features, and a corresponding variety in the flora. Goole was situated on alluvial, formerly marshy ground at the junction of the large tidal river near the head of the Humber, but the border of the district reached eastwards to the chalk of the Yorkshire wolds and the oolites and lias of the Lincolnshire hills, and westwards to the magnesian limestone range. The

district lay within the second, or "mid-agrarian" climatic zone of Mr. H. C. Watson, but might perhaps on the south extend into the first, or "infer-agrarian" zone, of which *Clematis Vitalba* was the characteristic plant. Among the many distinct local types of plants included in the district were mentioned the maritime plants of the tidal river banks, the bog plants of the deep peat morass of Thorne Waste, and the somewhat similar but distinct groups met with on the wet, sandy commons at Riccall and Rawcliffe, and those again different, which grew in the boggy ground by calcareous springs at Newbald and Askern ; the calcareous floras of the chalk wolds, of the extensive woods on the Lincolnshire oolites, and of the magnesian limestone hills about Wentbridge and Conisborough ; the aquatic plants of the fen ditches in Marshland ; and the sand-loving plants of the new red sandstone district about Snaith. The author laid on the table a list of 600 species of flowering plants and vascular cryptogams, all of which had been observed growing in the district by members of the society ; 65 of the list were additions made during the past year, some of them—as *Carex divisa*—being previously unrecorded for Yorkshire. The total number of plant records made at the excursions of the society during the past year was 640. Of the 600 plants of the district, 450 belonged to the British or British-English type of distribution, 100 to the Germanic and English-Germanic or eastern types, and a few to the Atlantic or western, and to the Scottish or northern type. As regards citizenship, 540 were considered natives, 40 denizens or colonists, and 10 aliens. The paper was illustrated by a number of dried specimens. A paper was read by Mr. Bunker, recorder for Vertebrate Zoology, on "The Birds of the Goole District." The reader stated the object of his paper to be to give the society a list of the birds he had noticed, with a few remarks on some of the more important ones. The usual divisions or orders of birds were adhered to, viz.,—birds of prey, perchers, scratchers, waders, and swimmers. In the first order hawks and owls were the chief birds mentioned. The fact of the buzzard being now very rare, was referred to. Among the perchers, chats, warblers, titmice, wagtails, pipits, crows, finches, buntings, wren, cuckoo, and night jar were especially named, and references made to their habits, voices, and nests, and the localities stated where some of them had been seen. Several well-known birds were named as belonging to the order of scratchers—as doves, partridges, and pheasants. A long list of wading birds was read, including the heron, bittern (now very rare), woodcock, snipes, sandpipers, grey phalarope (doubtful), curlew, plovers, rails, and water-hen. In the last order—that of swimming birds—were mentioned wild geese and ducks, divers and gulls. Attention was called to the fact that as the land becomes better drained and more cultivated, the number of birds in this order decreases.

CONVERSATIONAL MEETING, March 13th.—Two flowering plants, new to the district, were exhibited, *Sison Amomum* and *Chrysosplenium oppositifolium*. Dr. Parsons, F.G.S., exhibited a number of mosses collected

during the past season, including two new to the county—*Didymodon luridus* from Wentbridge, and *Hypnum imponens* from Skipwith Common. Taking *Polytrichum juniperum* as an example, the anatomy of mosses was demonstrated, and the moving *antherozoa* exhibited under the microscope.—H. F. PARSONS, Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting March 22nd, Mr. G. T. Porritt, in the chair.—Mr. James Varley exhibited the stonechat killed at Dalton March 5th (see p. 138). A conversation took place as to whether it was an early migrant, or had passed the winter in Britain ; being evidently a young bird the members generally, considered it had probably never left our shores. Mr. John Conacher shewed *Zonites radiatilis*, from Hey Wood, Honley. Mr. George Brook, a new air-pump for mounting microscopic slides. Mr. C. P. Hobkirk then gave a lecture with illustrations, on “How to examine a Moss microscopically.” Taking *Tortula muralis*, *Grimmia pulvinata*, and *Brachythecium rutabulum* as types he made dissections of them under the microscope, and detailed the process step by step, which should be taken to ascertain their identity : describing their various parts, and notably the construction of the capsule, and its various phases in different genera and the value of the areolation of the leaf in determining species ; and finally shewed that in thus working out specific distinctions in the mosses, the student necessarily became acquainted with the anatomy and minute structure of the objects he named.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Monthly meeting, 25th February, Mr. S. J. Capper, president, in the chair.—A paper was read communicated by Mr. J. H. Threlfall, of Preston, containing an account of the breeding of micro-lepidoptera. The usual conversazione then followed, at which 92 specimens of German micro-lepidoptera, presented to the museum by the Imperial Museum of Vienna, also a male and female *Angosoma*, from Guiana, were exhibited by the Rev. H. H. Higgins, and an improved apparatus for drying larvæ by Mr. West.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—Annual meeting, Mr. James Abbott, president, in the chair.—The eighth annual report showed that progress had been made in various respects, although certain important branches of science were totally unrepresented. The financial statement was satisfactory. Mr. F. Greenwood, M.R.C.S.E., was elected president. The retiring president then delivered his valedictory address, in which he briefly reviewed the Society's work during the year, and gave a sketch of the development of various forms of life. Mr. Kell's suggestion that the Union should, during the week of its annual meeting in Leeds, at the end of 1878, hold a grand combined exhibition of natural history objects and scientific apparatus, was then considered. The feeling of the members was strongly in favour of the idea being carried out on an adequately large scale, and a resolution to this effect was unanimously adopted.—W. D. ROEBUCK, Sec.

WAKEFIELD NATURALISTS' SOCIETY.—Meeting February 19th, Mr. J. Wilcock, v.p., in the chair. Master Hall exhibited a double specimen of common mushroom ; Mr. Fogg, *Sigillaria* lent to the Society by Mr. Fletcher White ; Mr. Sims presented a quantity of fossil ferns.

MEETING March 7th, Mr. Wilcock in the chair.—Mr. W. D. Roebuck, of Leeds, presented a pamphlet, "The Locusts of Yorkshire" ; Mr. Wrigglesworth, for the museum, two of Baker's Pictorial Charts of Birds ; Mr. Fogg, heron (*Ardea cinerea*) ; Mr. Spurling, a number of shells from the Red Crag, Walton-on-the-Naze, Essex ; the members of the Ovenden Naturalists' Society, a fine collection of geological specimens. Votes of thanks were accorded to all. Mr. Sims exhibited four varieties of *P. pilosaria* and *A. prodromaria*, bred from several larvæ taken in the district ; Mr. Spurling, a quantity of flint arrow heads, spear heads, sling stones, and chippings, found on the Yorkshire wolds ; Mr. Wrigglesworth a case containing 101 species of beetles.—J. W. SHAW, Cor. Sec.

NATIONAL ENTOMOLOGICAL EXHIBITION AT THE ROYAL AQUARIUM, WESTMINSTER.—This exhibition, which was undoubtedly the largest and most successful of its kind ever held, was open from the 9th to the 23rd of March. The project at first originated with Mr. John T. Carrington, naturalist at the Royal Aquarium, and editor of the *Entomologist* ; and, starting from such a head, its success became almost a certainty. A committee (nominated by the Royal Aquarium Society) of 33 well-known entomologists in all branches of the science, was formed, Messrs. W. Prest, of York, and G. T. Porritt, of Huddersfield, being the representatives of the county of York. The invitation of the committee was most heartily responded to, and the result exceeded even their most sanguine expectations. Every branch and aspect of the science seemed to be represented, though, as was natural, the exhibits in lepidoptera and everything connected with it preponderated over everything else. The exhibits were classified as follows :—1. Preserved specimens of all orders illustrating the insect fauna of Great Britain and Ireland. 2. Preserved specimens illustrating the life-histories of any species of insects. 3. Collections of insects beneficial or injurious to man. 4. Insect productions used in commerce, especially those resulting from sericulture and apiculture. 5. Collections of preserved larvæ and pupæ of any order of insects. 6. Books, illustrated or otherwise, appertaining to entomology. 7. Apparatus used by entomologists. 8. Cabinets for entomological collections. 9. Microscopic preparations of insects, and microscopes. Yorkshire was well represented ; Messrs. Prest, Dennis, and Jackson, of York, exhibited together a splendid collection of lepidoptera, including hermaphrodite *Epione vespertaria* ; *Eupithecia extensaria*, taken near Hull in 1873, the only British example ; *Eubolia mæniata*, taken in Yorkshire in 1866, also probably the only British specimen ; a bone-coloured *Hesperia linea*, taken at York, with many other rarities ; Messrs. Porritt

and James Varley, of Huddersfield, some of the choicest specimens from their cabinets, including the *Chœrocampa Nerii*, taken at Hemel Hempstead in 1876 ; extraordinary varieties of *Cidaria suffumata*, *Bombyx quercus*, *Polyommatus phœas*, *Arctia caja*, *Abraxas grossulariata*, *Callimorpha dominula*, and others. The other Huddersfield exhibitors were Mr. S. L. Mosley, who showed fifty plates of exotic butterflies, painted by himself, &c. ; and Mr. George Brook, who showed a fine series of slides of mounted scales of lepidoptera. It will be impossible to mention even a tithe of the many objects forming the general collection. Perhaps the most interesting of all to us was the magnificent collection of larvæ (with perfect insect, &c.,) preserved and exhibited by the Right Hon. Lord Walsingham. Too much cannot be said in commendation of this exhibit, presenting as it did to our mind the ideal of what a collection should be, to be both beautiful and educational in the highest degree. Scotch lepidoptera were represented by a fine collection of Perthshire insects sent by Sir Thos. Moncreiffe ; whilst the peculiar lepidopterous fauna of the fens of Norfolk and Cambridge was shown in splendid style. In Mr. J. R. Wellman's rich cabinet we noticed many splendid varieties, including a yellow form of *Zygaena trifolii* corresponding to the Cambridge variety of *Filipendulae* ; very variable series of *A. prunaria*, *C. russata*, *T. crepuscularia*, &c., with odd extraordinary forms of *V. cambricaria*, *A. immutata*, *S. clathrata*, *M. tristata*, and many others. Mr. W. Harper, the Rev. Windsor Hambrough, M.A., Messrs. Howard Vaughan, Thos. Eedle, E. G. Meek, J. A. Clark, and others also showed capital collections of macro-lepidoptera. The micro-lepidoptera were represented by the rich collections of Mr. Walter P. Weston, Dr. P. H. Harper, W. Machin, and J. Jenner Weir, F.L.S., so well known in this branch of study. Mr. C. A. Briggs showed his remarkable collection of varieties of *Polyommatus* ; Dr. Battershall Gill, an almost complete collection of the genus *Eupithecia*. *Colias Edusa* was in profusion, as befits the time : some of the forms were most unusual, but one with the right side of the variety *Helice*, and the left side *Edusa*, shown by Mr. W. P. Weston, was perhaps the most extraordinary. Exhibitors of exotic species were the Rev. Augustus Walker, M.A., J. Jenner Weir, F.L.S., A. Swanzy, F.L.S., and many others. Turning to other orders, perhaps the two finest collections of coleoptera in Britain—those of Dr. J. A. Power and Mr. G. C. Champion—were shown ; also the most complete collection known of British Curculionidæ, by Mr. S. Stevens, F.L.S., besides numerous others. Mr. Frederick Smith contributed the most complete collection of British hymenoptera in existence, the result of forty years' assiduous collecting ; and hemiptera was also represented by Dr. J. A. Power's most complete collection. Microscopic entomology was abundantly represented by the aid of about forty microscopes, by nearly as many exhibitors ; whilst collecting apparatus of every conceivable kind were shown by Messrs. Thos. Eedle, E. G. Meek, Ashmead, Argent and Co., Thomas Gurney, T. Cooke and Son, and others.—G. T. P.

Diary.—Meetings of Societies.

- April 1. Leeds Geological Association—Paper: “Levels of the Country round Leeds.”—Walter Bentley. Huddersfield Naturalists’—“Indigo, Madder, and Turmeric”—William Nettleton.
,, 2. Bradford Naturalists’—Paper on “Astronomy.”—B. Illingworth. Leeds Naturalists’ Club &c.—Opening Address by the president, Mr. F. Greenwood; 8 p.m. Bishop Auckland Naturalists’ Club. Liversedge Naturalists’.
,, 6. Clayton West Naturalists’—Paper on “Botany.”—Wm. England.
,, 9. Leeds Naturalists’ Club, &c.
,, 10. Goole Scientific Society—Annual Meeting. York and District Naturalists’ Field Club.
,, 11. Conchological Society of Great Britain and Ireland (at Leeds).
,, 12. Huddersfield Scientific Club—Paper by George Brook ter.
,, 13. Huddersfield Naturalists’.
,, 15. Leeds Geological Association—“Notes on some Lower Oolite Fossils.”—Thos. W. Bell.
,, 16. Bradford Naturalists. Leeds Naturalists’ Club, &c.—Paper by S. Jefferson, F.C.S.
,, 22. Easter Monday.—Yorkshire Naturalists’ Union, at Red Lion Hotel, Pontefract, for Went Vale. Tea at 4 p.m.; Sections at 5 p.m.; General Meeting at 6 p.m. President, H. Clifton Sorby, F.R.S., &c.
,, 23. Leeds Naturalists’ Club, &c.
,, 25. Conchological Society, at Leeds.
,, 29. Leeds Geological Association—Paper: “The Yorkshire Coal Field.”—B. Holgate, F.G.S. Huddersfield Naturalists’—Paper on “British Song Birds”—Jas. Varley.
,, 30. Bradford Naturalists’—Paper on “Grasses.”—W. West. Leeds Naturalists’ Club, &c.—Paper on “The changes undergone by a Vertebrate Ovum,” by Mr. James Abbott.

Books, &c., RECEIVED.—*Midland Naturalist* (Mar.), *American Journal of Microscopy* (Mar.).

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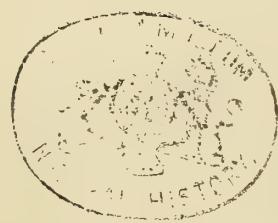
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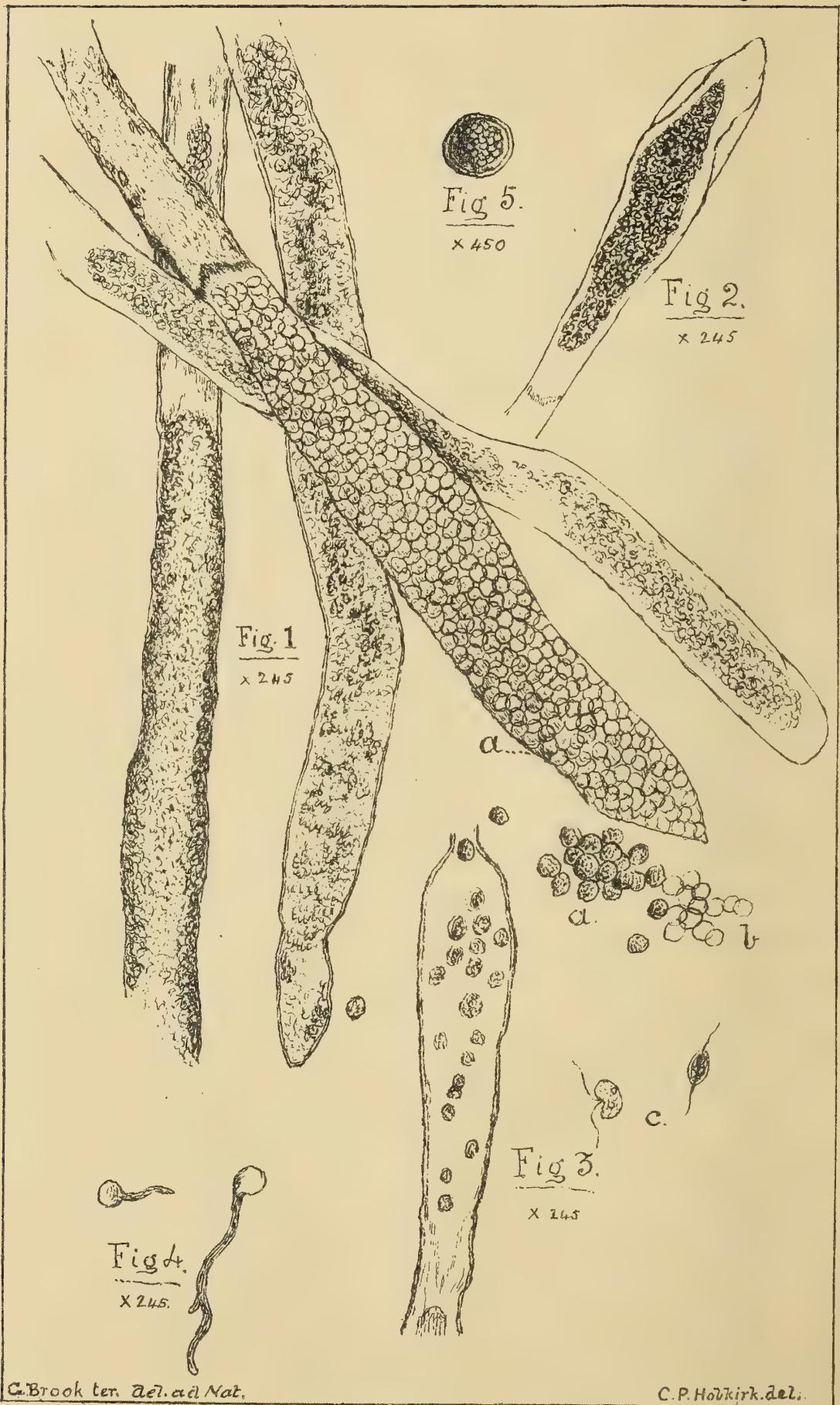
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Original Articles.

SALMON DISEASE IN THE EDEN.

By GEORGE BROOK, *ter.*

(Read 12th April, before the Huddersfield Scientific Club.)

A DISEASE has lately broken out in the Eden, Esk, and neighbouring rivers, which has decimated the salmon to a fearful extent. When seen in the water a diseased fish appears piebald and has its head and other parts covered with a thick white coat of fungus, but out of the water this is not so easily recognised. When very badly diseased the fish looks as if it had a thick white night-cap tied over its head, the upper films of which float to and fro as the fish moves slowly in the water.

The fungus usually first appears as a small white spot on the nose ; the fish then finds a still pool and usually lies near the edge of the water, and after this does not move about much ; in a few days the fungus spreads in a thick white coat over the head and gill covers, and breaks out at the tail, fins, and any place where the skin is broken ; by this time the fish can scarcely see, and the filaments of fungus are so thoroughly matted together over the gill-covers that it is with difficulty the fish can open its gills at all. In a few days more the fish is dead. On opening its mouth you will find the throat completely stopped up with fungus, and the inner surfaces of the gills laced with its filaments. The blood is quite black, and it is evident the fish has died from suffocation.

This disease appears to be confined to the fresh water, though I am told a fish was caught below Carlisle a few weeks ago which was badly diseased and had the "sea lice" (*Argulus*) on its gills. The epidemic has perhaps been worst in the Esk, where the watchers buried 200 salmon in one day between Langholm and Longtown, and 150 in the next two days. The fungus has spread to the smolts (young salmon), trout, eels, lampreys, minnows, pike, and flounders, and the fear is now that the disease may get thoroughly established in the district.

Examined with the naked eye the fungus shews itself in beautiful tufts of long hair-like filaments of a slaty white appearance when young, which get darker as the plant grows older. Under the microscope the filaments are seen to be occasionally branched, and to contain a fine granular mucilage, generally denser at the edge of the filaments, but occasionally clustered into minute masses scattered

irregularly through their substance. The filaments are without septa, thus differing from *Peronospora*. The fungus appears to belong to the genus *Achlya* Nees. (*Saprolegnia* Kützing), which according to the Micrographic Dictionary is to be found "growing parasitically upon the bodies of dead flies lying in water, also upon fish, frogs, &c., and in some cases upon decaying plants." The filaments vary in thickness from $\frac{1}{100}$ th to $\frac{1}{50}$ th of an inch, being usually smallest where they are closely crowded. With a good $\frac{1}{4}$ " objective the granular matter may be seen to circulate in the filaments, generally appearing to oscillate backwards and forwards in a given area, but occasionally (when accumulating to form a fruit head) moving much more actively.

When a filament is a few days old, the granular matter accumulates towards the tip to such an extent as to give it a slightly clavate form. A septum is then formed so as to enclose the granular matter, and thus cut off the sporangium in which the zoospores develop. A little hooked tip is formed at the end of the sporangium, and it is here that it bursts when ripe. The spores do not take long to ripen, and then the case bursts, and emits a mass of tiny globular cells containing apparently only a few fine granules. For a few hours they remain clustered together, and in the meantime develop a thin transparent envelope which seems to be made only to shed again, for all at once the envelope bursts, and an active zoospore escapes, which rushes in and out of the field of the microscope with great activity. In this state the zoospore is kidney-shaped, and has two cilia attached to the concave side, by which it propels itself. In a few minutes, however, the zoospore comes to a state of rest, resumes its original globular form, the cilia drop off, and it secretes for itself another coat. In a little while a prominence appears, which is gradually extended in the form of a nearly transparent tube, until all the substance of the spore is used up; of course, if the spore could have settled on its food it would have grown to reproduce itself as before. There will be from 50 to 100 zoospores in one fruit club, so that, considering the short time they take to develop, there is no wonder the fungus so soon covers the fish. As soon as one fruit club is done with, another develops immediately beneath it, or on a lateral branch, and this process is continued until all the granular matter in the cells is used up.

Besides this process of reproduction, however, there is another by means of resting spores, which occurs less frequently, and generally later on in the life of the fungus. The head containing the resting spores is generally more or less globular in form, and the spores are

much larger and fewer in number than the zoospores. They are not released by the bursting of the sporangium, as in the case of zoospores, but escape by its decay. These resting spores do not germinate at once, but seem to fulfil the office of seeds proper, and remain over to another season—at least those of *Peronospora* do, and it is likely this species will develop similarly. Up to the present I have had no resting spores germinate.

It seems probable that the salmon fungus, and the fungus known to pisciculturists as “byssus,” are identical, or, at any rate, that both belong to the same genus.

In the Carlisle district the disease is generally regarded as presenting a totally different appearance to anything seen before. Kelts, they say, die every year after the spawning season, and are attacked by a fungus, but this does not present the piebald appearance now seen, nor is it so white in the water. At any rate, the disease is not new here to fish in confinement—gold fish, gudgeon, and other fish dying from a fungus which I find to be identical with that on salmon.

After treating with a 10 per cent. carbolic acid solution, or a solution of Tidman's sea salt in water sp. gr. 1·026, for several days, the circulation of the granules in the filaments is still visible; the growth of the fungus appears arrested, however, but it is not clear that this is the effect of the solution.

In confinement, trout, ova, and avelins die of “byssus” from a combination of several causes, the most important of which appears to be the want of a sufficient supply of clean fresh water, and this would point to the low state of the rivers during the present spring as being, at any rate, a factor in causing the disease. Overcrowding may have been another, as the fish were unusually plentiful during the early spring; but it appears difficult to entirely account for the disease.

EXPLANATION OF PLATE I.

FIG. 1.—Various stages in the development of the filaments of *Achlya*.
 (a) Fruit club nearly mature.

FIG. 2.—Fruit club before formation of the spores.

FIG. 3.—Fruit club after bursting.

(a) Mass of spores.

(b) Cases after active zoospore has escaped.

(c) Active zoospores.

FIG. 4.—Development of zoospores.

FIG. 5.—Resting spore.

Fernbrook,

Huddersfield, April 18th.

HINTS ON COLLECTING INSECTS.

DIPTERA.

By S. L. MOSLEY.

IT is my intention, during the coming season, to devote my energies to some of those classes of insects which do not receive their proportionate share of attention from naturalists generally ; and as I should very much like others to walk in the same track, I think a few short hints on collecting and preparing them for the cabinet will not be out of place. I will gladly give such hints as are in my power, and wish I had been better acquainted with the subject, so that I might have done more ; however, "where there's a will there's a way," and those who have read the life of Thomas Edward will not be afraid to take up a neglected order of insects because there is no one at his shoulder to give him every scrap of information he asks. The best friend and helper is perseverance, and unless a person possesses this quality it is no use trying to earn the name of a true naturalist.

But space is precious : I must be brief. The apparatus for collecting Diptera are almost precisely those adopted by lepidopterists. A gauze net for the swift-flying species (as most of them are), a stronger net for sweeping grass, &c., and a good supply of chip boxes, are the principal necessaries for field work. A great variety may be taken on flowers, especially ragwort and dandelion, a lot of these will belong to the *Syrphidæ* ; others may be taken about dead animals, as the genus *Musca* ; others, like the common *Scatophaga stercoraria*, frequent the neighbourhood of dungheaps. Some are peculiar to woods, and sometimes become a perfect nuisance like the great *Tabanus bovinus* in the New Forest. Some species are parasitic on birds, the red grouse has one, the swallow has one, two at least live in the fur of bats, and one species only is without wings. Several species may be bred from the larvæ of lepidoptera, and it would be well if these were taken care of by lepidopterists whenever they appear. A number of different kinds may be taken during the day on the patches of sugar laid on the trees for moths the previous night. Many which would otherwise be overlooked may be taken by sweeping grass in woods, &c. These sweepings should be put into large chip boxes, and may be killed and examined at home. The leaf miners may be bred, and the best breeding cage I have found is a physic bottle, cut in two with a red-hot poker ; a strip of paper is then pasted several times round the upper half, allowing one-half to overhang the edge of the glass, so that when it is dry it slips on the

lower half like a lid, and having a cork in the neck it is then almost air-tight. The leaves may be put in and allowed to bide their time, and any notes may be pinned to the cork on the top. The beating tray will also be useful for taking members of the gnat family, and others from shrubs or herbage. The sea shore will furnish some among sea-weed, or on the bare sand, like *Actora aestivum*, which may be found by the million, but a fearful thing to catch, for just when you think you have got one in the box, it is away somewhere else, and they are generally so numerous that it appears a foolish thing to start netting for the sake of one or two. A great many besides *Musca domestica* may be taken in the house, and they are easily seen, as they always make to the window to get out again. In fact, Diptera may be taken almost anywhere. One line of advice: Never take a specimen without attaching a label with date and locality.

Diptera may be killed like lepidoptera. A good plan, when there is a lot to do at once, is to open each chip-box a little and pile them up, then set fire to a little brimstone, and cover with an earthenware pot. The larger species may be pinned; the pin must then be thrust into a slab of cork till the thorax nearly touches the cork. The legs must then be set out upon the cork, and the wings must either be left in their natural position or set out on little trays of cardboard, supported by a pin on each side of the insect. When the wings are in position they may be secured by a brace of cardboard over the wing, pressed down upon the tray below. When dry they may be removed, and a round or square piece of note paper slipped on the pin, to support the feet, bearing the locality and date of the capture. The smaller species may be gummed (with tragacanth) to slips of white card, and the wings may sometimes be got into position easily by floating the specimens on a basin of water, and lifting them out with blotting paper inserted underneath. When dry they may be transferred from the blotting paper to the card without injury.

Primrose Hill, Huddersfield.

ON THE STUDY AND COLLECTING OF HYMENOPTERA.

By W. DENISON ROEBUCK.

THE very pertinent suggestions made in the March *Naturalist* by Mr. S. L. Mosley deserve the best consideration which Yorkshire entomologists can bestow, and are at this time much needed. We ought—and why should we not be able?—to include within our Union students of

all orders. It would be of advantage to those who may be inclined to take up in good earnest the study of one of the "neglected orders," if in the pages of the *Naturalist* they could obtain some idea of the manner in which they ought to set about it, how they are to procure the material, and what books are accessible for the identification of the specimens obtained. And to this end I hope that Mr. Mosley and others will supply these wants in an article or two, which no doubt the editors would insert.

I propose to give a few hints which may possibly be serviceable to any who may feel tempted to take up some portion of that great order which I may be pardoned for considering the most interesting of all orders of insects—the Hymenoptera, of which there are nearly 4000 British species.

Speaking roughly, the principal groups of Hymenoptera are, the Mellifera (bees—204 British species), the Diplotera (wasps—20 species), the Fossores (119 species), the Heterogyna (ants—35 species), the Chrysididae (22 species), the Ichneumonidae (1186 species), the Braconidae (439 species), the Evaniidae (7 species), the Oxyura (373 species), the Cynipidae (gall-flies—about 30 species), the Chalcididae (possibly over 1000), and the Tenthredinidae (saw-flies—about 300 or 400 species). Of a few of these groups we are in possession of text-books in English at very moderate prices; while with regard to other groups it will be necessary to understand Latin, German, French, Dutch, and Swedish, in order to wade through the voluminous literature which is necessary to the identification of the species.

The bees are a group which can be at once attempted by our Yorkshire entomologists who may be willing to win their laurels on untried ground at small cost. For five shillings the beginner can provide himself with a manual which is in itself all that is necessary for the naming of British bees: this is Mr. Frederick Smith's "Catalogue of British Bees in the Collection of the British Museum," published in 1876 (may be had of the chief librarian, B.M.). Directions for collecting and preserving bees will be found in the Entomologists' Annual for 1856, in Science Gossip for October 1875, and in the Entomologists' Monthly Magazine for June and August, 1875. Briefly it may be stated that bees may be obtained in numbers at various flowers, and that the solitary bees may be found burrowing in sandbanks, roadsides, pathways, hedge-bottoms, &c., that the wood-boring bees must be looked for on posts and railings. Bees may be caught with the net, and in the case of some of swift flight that

instrument is necessary; but as a general rule they may be safely taken with the fingers. Bees should be put each in a separate pill-box, and should not be pinned in the field. Arrived at home, they should be killed by the fumes of sulphur in the following manner:—Open every pill-box just sufficiently to allow the fumes to penetrate and prevent the bee escaping: pile up the boxes inside a tumbler, or bell-glass: then light a little powdered sulphur on a stick, and insert it under the edge of the glass if the sulphur goes out, repeat two or three times, and leave the whole till morning, when the insects will be found in splendid condition for setting. For further directions see the articles referred to above. Try to collect the sexes of the solitary bees, and of the social ones—the humble bees—collect all the different kinds, males, females, and workers.

The wasps, ants, and fossores are also monographed by Mr. F. Smith (*British Museum Catalogue of British Fossiliferous Hymenoptera, Formicidae and Vespidae*, 1858, price 6s.), and consequently present another favourable opportunity for the beginner.

The student of British wasps can also avail himself of the fine coloured plates of all the British species, and figures of their nests, given by Dr. Ormerod in his “*British Social Wasps*,” (Longmans, 1868, price 10s. 6d.), for naming his species. The distinctive characters of our seven social wasps are taken from the face and the basal segment of the abdomen; these details are figured by Ormerod. Wasps may be induced to build nests in confinement of various eccentric shapes at the will of their owner, and naturalists will find their habits in captivity of great interest.

The insects of these groups require nearly the same directions as for the bees, but they are more lively and active, and many of them require a net, a sharp eye, and quick hand, for their capture. Sandy districts will be found most productive of both bees and other hymenoptera, especially the coast sand-hills.

An excellent plan of procuring various bees, fossores, and their parasites is, by collecting perforated sticks in hedge-bottoms and breeding the insects from them. These sticks may be collected from autumn to spring, and their collection will furnish winter work to the hymenopterist, who is otherwise dependent upon a seasonable summer for his success.

These groups constitute the Aculeate, or stinging division, of the order. Possibly some may be deterred from the study for fear of the stings, but this danger is in most cases more imaginary and real

With practice these insects can be caught by hand without their being able to sting, and should even the insects have recourse to "the last resort" of bees, the pain may be relieved by the application of powder-blue to the wound.

The collector of the family Chrysididæ, a small group of 22 species of the most beautifully resplendent and intensely metallic colouring, will find that they are monographed by Mr. F. Smith in the Entomologists' Annual for 1862 (price 2s. 6d.) The names given to these little gems (*ardens*, *fulgidus*, *auratus*, *ignitus*, *aeneus*, *roseus*, *servidus*, &c.) show how describers were put to the rack to express their due sense of the vivid intensity of their colouring. They are all parasites on other Hymenoptera, and the commonest of them, *Chrysis ignita*, may be found any hot sunny day flying along the face of walls, searching with quivering wing the crevices for the nests of their enemies, the solitary bees and wasps.

The sawflies have not as yet been honoured with a monograph in the English tongue, although it is believed one is in preparation for the Ray Society by Mr. Peter Cameron, of Glasgow, who would seem to be almost the only British student of the group. For the present, however, the species must be worked out by the aid of Thomson's "*Hymenoptera Scandinavie*" 1st vol., which is a monograph of the Swedish species (in Latin, price about 11s., may be had of Friedländer and Sohn, 11, Carlstrasse, Berlin), and of the German works of Brischke, Hartig, Klug, and Zaddach, and the French ones of Brullé and St. Fargeau. The larvæ of the sawflies are to all outward appearance, both in shape and habits, like those of lepidoptera, feeding on leaves, and are to be procured and reared in precisely the same way. They differ from them chiefly in the number of legs or claspers, which are very much more numerous in saw-fly larvæ than in lepidoptera. A paper by Prof. Westwood on "Saw-fly Larvæ," in one of the Entomologists' annuals, is worth attention. Some saw-fly larvæ are leaf-miners, and others are gall-producers.

There do not seem to be any available manuals for the student of gall-flies, although several have been projected. The galls can be collected and reared at home, or where it is more convenient, a green gauze cover can be tied over the gall in the place of its growth.

The Ichneumon-flies and, other allied groups, are in a still worse position as regards their literature. Recourse must be had to Gravenhorst's *Ichneumonologia Europea*, to Holmgren's *Ichneumonologia Suecica*, to Desvigne's British Museum Catalogue of British Ichneumonidæ (1856, price 1s. 9d.), and other works by numerous authors.

For the Chalcididae there is little other guide than Walker's *Monographia Chalciditum*.

The large species of ichneumons can be killed and set in the same manner as bees. The minute species should be dropped into boiling water, when their wings will be naturally spread out, and need no more setting. Then a card can be placed under them, lifted out and left to dry. Afterwards the insects can be gummed to the points of triangular card braces on pins.

But if the collector cannot name his captures himself, he can, at all events, by forming collections with accurate notes, do much for the advancement of science by the accumulation of material for the men who are further advanced than himself. And what glorious opportunities our lepidopterists have of making solid and inestimably valuable contributions to the knowledge of this group, with very little trouble to themselves, by the simple process of boxing and labelling the ichneumons they breed, placing them afterwards in competent hands. And if the lepidopterist does suffer annoyance, as he must, at the appearance of an ichneumon instead of the rare moth for whose advent he has waited so long and so anxiously, let him make the best use of his misfortune by securing the offender, and, above all, let him remember that the advancement of science is of far more moment than the improvement of his collection.

One thing I wish to lay great stress on is the importance of making notes and of labelling all specimens with dates and localities. It is only by the carrying out of this system that we can reap the fullest benefit from our collecting, and I have long thought that our lepidopterists are much mistaken not to pay more attention to this important point.

I may here state that in the forthcoming report of the Entomological Section of the Yorkshire Naturalists' Union, the part devoted to hymenoptera will include a complete list of all the Yorkshire species known up to the present time, in the preparation of which Mr. Frederick Smith, who is the best hymenopterist in Britain, if not in the world, will have shared to a large degree. This will, consequently, form a very convenient starting point for the researches of our Yorkshire hymenopterists, of whom I should be happy to see a goodly number in course of time, and to whom I should be happy to render any assistance in my power. And if there are entomologists who, though not intending to take up the study themselves, may yet be willing to assist, I should be glad to take charge of any specimens they may give me, and I believe that my friend Mr. S. D. Bairstow,

who is taking up the Ichneumonidæ, would also be glad to receive specimens of that group.

I hope that the impetus given by Mr. Mosley's paper may result in the enlistment of recruits not only to this, but also to other of the neglected orders.

9, Sunny Bank, Leeds,
March 16th, 1878.

Rainfall for March.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1878.	1877.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	Ft. 350	In. 1·56	13	5·64	* 8·28	1	0·66
WAKEFIELD ... (F. Hill)	120	0·74	10	3·95	...	1	0·19
LEEDS ... (H. Crowther) ...	183	0·52	9	4·82	...	1	0·21
HALIFAX... (F. G. S. Rawson)	360	3·13	13	10·53	17·23	...	...
BRADFORD... (J. A. Douglas, [F.M.S.]	415	0·70	11	6·49	9·63	1	0·33
BARNESLEY ... (T. Lister) ...	350	0·58	9	3·86	8·96	1	0·19
INGBIRCHWORTH (do.)	853	1·92	15	6·97	11·90	1	0·89
WENTWORTH CASTLE (do.)...	600	0·62	8	4·41	10·08	27	0·22
GOOLE ... (H. F. Parsons) ...	25	0·75	9	2·68	6·12	9	0·21

* This is the average to date for 12 years, 1866-77.

Short Notes and Queries.

CHAFFINCH (VARIETY).—I have on several occasions had the pleasure of seeing, in a garden near my house, an almost albino variety of this bird. Its whole plumage is very light, the crown of its head, nape, rump, and almost all the tail feathers perfectly white. I think this finch is not often subject to variation, as this is the only specimen that has come directly under my notice.—G. PARKIN, Brampton, Cumberland, March 21st.

VARIETY OF CHAFFINCH.—I called to see Mr. Talbot, of Wakefield, early in March, and he showed me a beautiful variety of a male chaffinch which I think worth recording. The breast and belly were of the normal colour, intermixed with about 40 per cent. of white feathers; the head and neck nearly all white; the back and wing feathers white, with patches of the normal colour, and here and there a shade of the most

beautiful canary ; tail, with the exception of about three or four feathers, white.—S. L. MOSLEY, Primrose Hill, Huddersfield.

STONECHAT.—During the visit of the Yorkshire Naturalists' Union to Askern, on Whit-Monday, 1875, I distinctly remember that when climbing the side of a disused quarry (to get a plant growing almost out of reach), disturbing a bird from its nest. The bird was seen, its nest and eggs examined, one egg broken during examination, and by some of the persons present, who I presume were ornithologists, was said to be a stonechat. I have not myself the least knowledge of ornithology, but perhaps this may recall the above incident to someone present, who may be able to verify or correct my note that the stonechat was seen at Askern at that time.—THOMAS BIRKS, Jun., Old Goole Mill, Goole, March 6th.

GRASSHOPPER WARBLER AT BINGLEY.—Referring to Mr. Carter's note (vol. iii., p. 138) on the occurrence of the grasshopper warbler near Bingley, I may state that I did not wish it to be understood that it did not frequent this district. At the same time, I think that the mere fact of hearing a bird does not identify it beyond the possibility of a doubt. When we take this into consideration, also the nature of the habitat where heard, and the advanced season—when nearly all our "feathered songsters" are absolutely silent—it is just possible Mr. Carter might have been mistaken. May it not have been the "jocund voice" of "the sweet prophet of summer"—I mean the large green grasshopper (*A. viridissima*), which (the male) sings almost incessantly during the fine sunny days of July and August?—E. P. P. BUTTERFIELD, Wilsden, April 12th.

MIGRATORY ARRIVALS.—I saw a solitary swallow on the 13th April, in the Ryburne Valley, and have every day since constantly seen the same bird (at least I presume it to be the same) on the wing, but no others had up to the 18th of the month appeared here. It is nearly three weeks earlier than the first swallow seen in this district last year, and considerably earlier than the average arrival, and is the more remarkable on account of the severe weather at the beginning of the month. The willow wren came about the 10th April, and the wheatear reached the moorlands in the vicinity of Halifax the previous week.—F. G. S. RAWSON, Halifax.

Saturnia carpini COCOONS.—Having had occasion to cross the moors very frequently which surround this village, during the last autumn and winter, I noticed that a very large quantity of the cocoons of *Saturnia carpini* were empty. Upon examination, I found they were all perforated near their base, and the chrysalis extracted. The greatest destruction took place at the end of October and the beginning of November. Are you in possession of any information as to the cause—whether it is the birds, as I suppose it is, and if so, whether it is any particular species? Fieldfares visited the moors in great numbers at this particular period, but whether this was a mere coincidence, or they were the cause of this destruction, I am not in a position to determine.—E. P. P. BUTTERFIELD, March 12th.

Scaphidium quadrimaculatum AT WENTBRIDGE.—Upon my return from a ramble in Wentvale and its neighbourhood this evening, I discovered amongst my captures a single specimen of *Scaphidium quadrimaculatum*, Oliv. The beetle is quite new to me, nor do I remember having heard before of its being taken on Yorkshire ground.—E. B. WRIGGLESWORTH, Wakefield, April 22nd.

Elodea canadensis.—May not broken fragments of the stem of this plant be conveyed from place to place by water-fowl, and its presence in isolated ponds be thus accounted for? I have myself seen water-birds disporting themselves amongst it in such a manner as almost to ensure the entanglement of small portions of the plant under their wings or otherwise. A believer in spontaneous generation would never hold that a plant so high in the scale as *Elodea* was spontaneously generated in the ponds referred to, and therefore *some* mode of conveyance must be imagined. The above explanation seems to me to have no particular improbability in it, and I therefore offer it as a suggestion.—W. FOWLER, Liversedge Vicarage, Yorkshire, April 3rd.

YORKSHIRE MOSESSES.—I shall be glad to be allowed to make a few brief remarks about some mosses. First as to *Hypnum giganteum*, found by me above Ilkley. I sent this to Mr. Hobkirk by the advice of Dr. Lees, who informed me that it had not previously been recorded for Yorkshire, and therefore ought to be. I accompanied the specimen with a letter, in which I happened to remark that it had not been found by Mr. Baker, when investigating the locality where I found it, or he would no doubt have mentioned so rare and fine a moss. By this I only meant to say that he had not happened to light on it. But, as was most earnestly pointed out to me by Dr. Lees, I soon saw that Baker's description of this locality was not meant to be exhaustive, but only to give a general outline of the features and flora of an eu-geogenous formation, and he chose the place as being so well known. It is not, too, in North Yorkshire. Any locality in North Yorkshire will be found to be thoroughly well described in his book. Now as to the two mosses—*Didymodon luridus* and *Hypnum imponens*—recorded by Dr. Parsons in the April number of the *Naturalist*, and said to be new to Yorkshire. I have *D. luridus*, found by me in November last. This I sent, amongst others, to Mr. Hobkirk. It is given in the March number. Then as to *Hypnum imponens*: I have a specimen labelled Strensall Common, and sent me by Dr. Braithwaite last year, and with this I send it, found by me also at Strensall in March, 1877, and now, as will be seen, verified by Mr. H. Boswell. Let it not be thought that I have any wish to be the first finder of a moss; I only wish for perfect accuracy. I do not see the exchange system in force yet. I have plenty to give away. Letters of application, giving list of wants, will be attended to.—J. S. WESLEY, Wetherby.

Hypnum imponens.—On April 6th I searched the part of Strensall Common (near York) where last year I found *Hypnum imponens*. After

some time, and much examination of the abundance of *H. cupressiforme* also growing on the sandy peat amongst the heather, I at last came on the true *H. imponens*. It is of a far brighter yellow than any *cupressiforme* I ever saw, and the lower part of the plant of a rich chocolate brown. The leaves are more delicate—more circinate and filiform. These are points at once visible without a lens. I sent it to Mr. Boswell, partly to get his decision, as to which I suppose there will be no doubt, and partly because he had asked me for it. I have had the pleasure of sending some to Mr. Hobkirk, and will gladly give some to any applicant. I should like to see in the *Naturalist* a list of the localities known to the present time.—J. S. WESLEY.

Hypnum imponens IN YORKSHIRE.—“It appears that you (Dr. Wesley) are not the only one who has gathered this moss on Strensall Common, for Mr. Stabler has just sent me two specimens gathered there by himself four or five years ago, one so-named and the other blank, both of which I consider to be the real thing *sine ullo dubio*, though the blank one lacks the characteristic colour and seems to have been sunburned. The cellular structure of the base of the leaf appears to me so different in *imponens*, that if a microscopic examination is made there can be no difficulty in recognising the plant: but without that it bears so much resemblance to ordinary forms of *cupressiforme* that a casual glance may readily deceive one, though the glossy golden green above and the chesnut brown of the under parts of the tuft, when the attention has once been drawn to them, seem to offer a ready means of recognition. I, at least, have never seen the same colours in any of the numerous forms of the commoner species. It seems to me by no means so difficult to discriminate between the two mosses in question as between some others. Mr. Stabler tells me Wilson was the first to gather *H. imponens* at Strensall. Amongst your *imponens* I found a solitary detached capsule, very young, which may have belonged to it or not; it was the right shape, but too immature for certification. If you could find fruit, it would be new to Britain; at any rate, it is worth trying. I can only find as yet flowerless stems so far as I have seen.”
H. BOSWELL, Oxford, April 10th.—(Extract from letter.)

REVIEW.—“Illustrations of Varieties of British Lepidoptera.” Part I., March, 1878. Huddersfield : S. L. Mosley, Primrose Hill. Price 8s.—We congratulate Mr. Mosley on the opportune appearance of this book. Perhaps at no previous time has there been so much interest taken in unusual forms or aberrations in lepidoptera, and Mr. Mosley’s effort will supply a want which would before long have begun to be felt. The first number before us contains six plates, all coloured by hand from specimens lent from various cabinets in the country; and the execution of them deserves every praise. We consider the plates of *Chelonia caja* and *Abraxas grossulariata* about the best, but it is difficult to select where all are so good. We should think every lepidopterist interested in varieties will at once become a subscriber to this work.

ANSWERS TO CORRESPONDENTS.—“Brooke,” Moldgreen.—We cannot insert anonymous communications unless vouched for by the real name and address of the sender, accompanying them.—*Eds. Nat.*

Reports of Societies.

BARNESLEY NATURALISTS' SOCIETY.—Adjourned Meeting, April 16th, in the New Room at the Public Hall. The president, Mr. T. Lister, read a letter from Mrs. Wright, of Worsborough, offering the valuable specimens of preserved birds collected by her late husband, Mr. C. Wright, one of the oldest supporters of the Society. This gift was gratefully accepted. The observations from March 1st to the present time were given by different members; amongst them, on March 12th, a pied flycatcher (*Muscicapa atricapilla*) was seen in Stainborough Park, one of the localities of this rare migrant, the other being Wharncliffe and Cannon Hall.—T. LISTER.

BRADFORD NATURALISTS' SOCIETY.—Meeting March 19th, the president in the chair.—Many botanical specimens were shewn, including *Vaccinium Vitis-Idaea*, also several species of lepidoptera, including *L. multistrigaria*, taken on March 16th by Mr. Hopwood. Fossils from the coal measures and mountain limestone were shown. Mr. West continued his paper on the Bradford Plants, at the conclusion of which the president pointed out the usefulness of many of the plants mentioned, as searching ground for lepidoptera.

MEETING April 2nd, the president in the chair.—There was a good show of specimens, entomological, botanical, and zoological. Mr. Jagger shewed four drawers of moths from his cabinet, amongst which were—*D. pilchella*, *D. galii*, *D. lineata*, *D. celerio*, *D. euphorbiæ*, *A. Atropos*, *S. ichneumoniformis*, *L. asellus*, *L. testudo*, and *S. convolvuli*.

MEETING April 16th, Mr. Firth in the chair.—Mr. Illingworth gave a lecture on “Astronomy.” Mr. Mosley’s new work (or rather the first number of it), on the varieties of British butterflies and moths, was shown by Mr. Carter, and excited great admiration by its extremely well executed hand-painted figures. Mr. Soppitt showed a good number of early flowering plants, including *Prunus Cerasus*.—WM. WEST, Sec.

CHICHESTER AND WEST SUSSEX NATURAL HISTORY AND MICROSCOPICAL SOCIETY.—We have received the report of this Society for 1877-8, and are glad to find it give promise of taking a good position amongst kindred associations. From the retiring address of the late president, Mr. W. C. Cooke, we find it was established through his instrumentality about fourteen years ago; and although at first its success was anything but encouraging, it gradually improved, and is now in a position which promises great future usefulness. The new president is the Rev. A. Fuller, M.A., and the secretaries Messrs. S. Baker and Joseph Anderson, jun.

GOOLE SCIENTIFIC ASSOCIATION.—Meeting March 27th, Mr. E. Hunter, F.C.S., the president, in the chair.—A paper was read by Dr. Parsons, F.G.S., on “Flowerless Plants and their Habitats.”*

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting April 12th, Mr. G. T. Porritt, president, in the chair.—Mr. S. L. Mosley exhibited the following interesting varieties of lepidoptera :—A bronze-green *Zygæna loniceræ* from Wakefield ; a female *Anthocharis cardamines* with a peculiar bright-red marking on the right fore wing ; and a hermaphrodite *Lycæna Alexis* from Burton-on-Trent, and a *Tæniocampa munda*, having a conspicuous dark central band, taken by himself (and the only specimen of the species observed) at Sherwood Forest several weeks ago. The chairman showed living larvæ of *Selidosema plumaria*, and *Gnophos obscurata*, reared from specimens taken in the New Forest. Mr. George Brook recorded the following observations in the neighbourhood of Carlisle, where he had recently been staying :—Cuckoo, April 5th ; swallow, April 6th ; also 36 species of wild plants in bloom, including *Primula veris*, *Saxifraga tridactylites*, *Fragaria vesca*, *Viola arvensis*, &c. He also recorded that a pair of ravens had laid eggs in confinement—a very unusual circumstance. Mr. C. P. Hobkirk exhibited the following mosses :—*Zygodon viridissimus*, and a peculiar barren form of *Ceratodon purpureus*, gathered by himself in Storthes Hall Lane, Huddersfield ; *Rhynchostegium murale* β *complanatum*, gathered by the Rev. W. Fowler near Liversedge ; and the following discovered by Dr. J. S. Wesley, of Wetherby, which have already been recorded in the *Naturalist* :—*Hypnum cuspidatum* β *pungens*, *H. giganteum*, *H. abietinum*, *H. scorpioides*, and *H. imponens*—the two last from Strensall Common, near York. Mr. George Brook then gave a most valuable lecture on the “Salmon Disease in Cumberland,” &c. (see page 145).

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meeting 25th March, the president, Mr. S. J. Capper, in the chair.—Mr. Roxburgh read a paper on “The unusual appearance of *Phigalia pilosaria* and *Hybernia defoliaria*.” The president drew attention to and exhibited the first number of “Illustrations of Varieties of British Lepidoptera,” being a series of plates drawn by hand by Mr. S. L. Mosley, of Huddersfield. Mr. Mosley adopted as his motto, “*Labor ipse voluptas*,” which explained how such an invaluable work could be produced at so small a cost.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—Meeting April 9th, Mr. John Grassham in the chair.—Mr. James Archer exhibited a number of shells from near Derby, including *Helix nemoralis*, *H. alpestris*, *Limnaea peregra*, *L. stagnalis*, *L. auricularia*, *Paludina viripara*, *Planorbis corneus*, *P. vortex*, *P. carinatus*, and *Unio pictorum*. Mr. W. E. Clarke showed a German specimen of the waxwing (*Bombycilla garrula*), and nest and eggs of other species of birds. Mr. Henry Marsh showed a mass of pike-spawn from Roundhay lake.

* Received for publication.

284TH MEETING, April 16th, Mr. James Abbot, V.P., in the chair.—Mr. Samuel Jefferson, F.C.S., delivered a lecture on “Glaciers: their origin, action, and results.”—WM. DENISON ROEBUCK, Sec.

Entomological Section.—The 7th meeting, 19th February, the family *Sphingidae* being the subject of consideration.—The best specimens were the fine varieties of *Smerinthus populi* and *S. tiliæ*, both bred by Mr. Smethurst. *Acherontia Atropos* was well represented, and localities recorded from all parts of Yorkshire. The *Sesiidae* were not very well represented, *S. cynipiformis* being the best species exhibited, which Mr. Smethurst had taken at Bishop’s Wood. Many other species were also exhibited.

8TH MEETING.—Mr. W. E. Clarke showed fine specimens of *Colias Edusa*, which he had taken in the Isle of Wight in 1877. One male specimen was very curious, having the upper wings of a light saffron colour. The *Zygenidae* were well represented, *Z. trifolii*, *Z. lonicerae*, and *Z. filipendulae* being the three species reported from Yorkshire. All the *Hepialidae* were well represented from the immediate neighbourhood.

9TH MEETING.—A large number of specimens were exhibited, most of them occurring in the district, Adel moor and its vicinity producing five of the species exhibited.

10TH MEETING, April 9th.—The secretary (Mr. Tyers) exhibited specimens of *Aporia crataegi*, *Argynnis Aglaia*, and *Vanessa Antiopa*, all from Brittany. Mr. W. D. Roebuck exhibited a male specimen of *Macropis labiata* and both sexes of *Andrena bimaculata*, taken at Norwich by J. B. Bridgeman, Esq., also a microscopic slide of *Allantus scrophulariae* showing the saws. Various species of the *Liparidæ* and *Bombyces* were also exhibited, the best of which were *Liparis monacha* and *Orgyia gonostigma* from Bishop’s Wood, *Paecilocampa populi* and *Eriogaster lanestris* from Thirsk, and the various heath-feeding *Bombyces*.

11TH MEETING, April 16th.—The various captures during the present season being taken: a number of specimens were shown, amongst which were *P. pilosaria* (earliest date March 11th), *Hybernia progemmaria* (February 2nd), *H. cæsularia*, *C. flavicornis* (March 4th), *H. leucophearia* (February 28th), and bred specimens of *B. hirtaria*, *A. prodromaria*, &c., being also exhibited by various members.—GEO. TYERS, Sec.

WAKEFIELD NATURALISTS’ SOCIETY.—Meeting April 4th, the president in the chair.—Mr. Sims exhibited *C. nupta*, *P. leucophaea*, and *A. mendica*, *C. corylata* bred this season. Mr. Fogg, *A. cæsularia*, male and female, heron, short-eared owl, kestrel, and buck’s head with a fine pair of antlers. Mr. Marson, a stoat in winter coat. Mr. Wilcock exhibited *L. globosa*. Mr. Fogg presented a variety of geological specimens, and Mr. Sims specimens of China grass in all its stages of manufacture. Mr. Toms read a paper on “The advantages of the study of Natural History.”*—J. W. SHAW, CORR. SEC.

* Received for publication.

Diary.—Meetings of Societies.

- May 2. Bradford Scientific Association,—“How to examine a Plant Microscopically.”—H. Pocklington, F.R.M.S. Liversedge Naturalists’ Society.
,, 4. Clayton West Naturalists’—“Study of Botany.”—J. Matthews.
,, 7. Bishop Auckland Naturalists’ Club. Leeds Naturalists’ Club, &c.
,, 8. York and District Naturalists’ Field Club.
,, 9. Bradford Scientific Association,—“Coal Tar Colours.”—W. H. Wood, of Leeds.
,, 10. Huddersfield Scientific Club—Paper by J. S. Cameron, M.D.
,, 11. Huddersfield Naturalists’.
,, 13. Leeds Geological Association.
,, 14. Leeds Naturalists’ Club, &c.—Paper by H. Pocklington, F.R.M.S.
,, 16. Bradford Scientific Association.—“Mosses.”—W. West.
,, 21. Leeds Naturalists’ Club, &c. North Staffordshire Naturalists’ Field Club, Excursion to Dovedale.—Leader Mr. Molyneux, F.G.S.
,, 23. Bradford Scientific Association.—Mr. Thornton,
,, 25. Yorkshire Naturalists’ Union—Excursion to Ilkley and Rombalds Moor. Tea at 4 p.m.; Sections at 4-45 p.m.; General Meeting at 5-30 p.m., Working Men’s Hall, Ilkley; Local Secretary, B. Illingworth, 3, Rebecca Street, City Road, Bradford.
,, 27. Leeds Geological Association—Presidential Address. Huddersfield Naturalists’—“The Scales on the Wings of Butterflies.”—George Brook, ter.
,, 28. Leeds Naturalists’ Club, &c.—“Suggestions for Microscopists.”—Benjamin Saynor.
,, 30, Bradford Scientific Association.—“Field Geology.” (Part II.)—A. Crebbin.

Books, &c., RECEIVED.—*Midland Naturalist* (Apr.), *American Journal of Microscopy* (Mar.), *Science Gossip* (Apr.).

COMMUNICATIONS RECEIVED from Dr. Parsons, F.G.S., — Toms, Chas. Dixon, F. A. Lees, F.L.S., York Naturalists’ Society, &c.

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No. XXXV.

JUNE, 1878.

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Original Articles.

A RAMBLE ON THE COTSWOLDS IN SEARCH OF *LYCÆNA ARION*.

By H. GOSS, F. L. S., &c.

As *Lycæna Arion* is a species whose geographical range in the United Kingdom is so very limited, and as consequently comparatively few British lepidopterists have had opportunities of seeing it alive in this country, some notes on its occurrence in the Cotswolds may not be without interest.

In the course of the last seventeen years I have had the satisfaction of seeing and capturing in various localities in the United Kingdom, which I have specially visited for the purpose, a considerable number of our most local lepidoptera; and of the *Rhopalocera* (excepting *Lathonia*, *Acis*, and *Dispar*), there are but three local species whose acquaintance I have not had the pleasure of cultivating in their respective haunts.

Lycæna Arion was one of the species which from my earliest years I always felt a very great desire to see alive, but it was not until June, 1876, that I had the pleasure of meeting with it.

Some eighteen years ago the only place in this country in which, so far as was then known to the majority of collectors, *Arion* could with certainty be met with was Barnwell Wold, Northamptonshire, and to that favoured locality I determined, in 1865, to make a pilgrimage. Accordingly, on the 16th of June of that year I left Brighton for Oundle, which I made my head-quarters, and where I stayed for ten days, visiting either Barnwell or Ashton Wolds nearly every day during my stay. The season of 1865 was a very forward one, and on the 17th June I found *Thecla pruni* "out" in profusion in the woods bordering Barnwell Wold. Even at this early date the majority of the male specimens were in poor condition, but the females were generally in good order. *V. C-album* occurred sparingly in Ashton Wold, but of *Arion*, for which I searched for hours day after day in every corner of Barnwell Wold, I never saw a specimen. I was afterwards informed by the Rev. W. Whall, then vicar of Thurning, who lived about half a mile from the Wold, that no specimen of *Arion* had been seen there since 1862 or 1863, and that the species had, he believed, been exterminated in that locality. This to my great disappointment I found to be the case, and after ten days I gave up the search, and went off to Cumberland for a month's collecting.

In June, 1867, I was working Monmouthshire and South Wales, and having been favoured by the Rev. G. C. Green, of Ivybridge, Devon, with particulars of some of the localities in South Devon in which *Arion* occurred, I determined to visit them, and was on the point of leaving Monmouthshire and crossing the Bristol Channel *en route* for South Devon, but the weather setting in wet just at the time at which I supposed *Arion* was coming out, I abandoned the idea, and made no further attempt to meet with this species until the year before last, when I thought I would try to find it in its haunts in the Cotswolds.

With this object in view, I left London for Gloucestershire on the 25th of June, 1876, and having spent the night in the town which I made my head-quarters, I started the next day at half-past seven a.m. in the company of my local correspondent, in a carriage and pair for the hills, where I proposed to spend two or three days in the immediate neighbourhood of one of the *Arion* localities.

The morning was dull and cold, and we had but little hopes of seeing *Arion*, or indeed any other butterfly, on such a day. The barometer, however, having been very high for some days previously, and having further risen considerably during the night, I hoped for the best, in spite of appearances. After nearly six miles' drive, we began to ascend a long hill, of which some two miles further on we gained the summit, and there halted. It was then about a quarter past nine, and the weather began to show signs of improvement. The clouds parted and exhibited patches of blue sky in various directions. Presently the sun shone out and the mists cleared away, and revealed a glorious prospect of hill and dale. Far below us lay the vale of the Severn, with its towns and villages, woods and streams; beyond, to the north-west, rising above some lower hills, the Malvern range stood out boldly on the horizon, and still further away, nearly due west, the Welsh mountains loomed dimly through the haze.

Having sent on the carriage with my portmanteau and entomological *impedimenta* to a small inn about a mile distant, we fitted our nets together and prepared for work.

Leaving the high road to the right, and following a steep path on the hill side for a hundred yards or so, we soon arrived on some rough waste ground, full of old quarries and pits, the sides of which were partially overgrown with long coarse grass and nettles. We were now on one of the few favoured spots in this country in which *Arion* still occurs, and I was told that I might expect to see it at any moment. Presently a large irony-looking "blue" came flitting

along the quarry in which I had taken up my position. It was immediately captured, and closing its wings in the net and feigning death, showed me the under side of a large specimen of *Arion*. On taking it out of the net it proved to be a female fresh from the chrysalis. After waiting for sixteen years my wish to see and catch this species was gratified, and having killed and securely pinned the specimen, I gave vent to my feelings by prolonged cheering.

In the course of an hour and a half's work I netted about a dozen more specimens, but many of them, even thus early in the season, were worn and chipped, and were therefore allowed to fly away. I was really glad of the excuse for setting them at liberty, for I never yet collected any very local species without being uncomfortably conscious that I was contributing, to some extent, towards its extermination.

The only other species which I met with in this spot were *L. Argiolus*, *Adonis*, *Alexis* and *Agestis*, and *Acidalia ornata*.

As *Arion* seemed so scarce in this locality, my companion advised a change of ground. After making our way to the inn to which our carriage had been sent on, and enjoying a good "drink" we proceeded westwards, and after about three miles ride arrived in our new hunting grounds.

The new locality consisted of a beech wood with numerous glades and lawns, and was one of the most picturesque spots I have ever visited, reminding me of some of the best scenes in the New Forest. In the open spaces the ground was carpeted with flowers, chiefly wild thyme, milkwort, trefoil, common bugle, &c., with here and there a clump of the beautiful fox glove, besides many *Orchidaceæ*.

Of the *Orchidaceæ* I noticed the following species : *Orchis maculata*, *Orchis pyramidalis*, *Gymnadenia conopsea*, *Listera ovata*, *Ophrys apifera* (very common) and *Ophrys arachnites*. Of the last named rare species I only found one specimen, and it was the first time in my life that I had ever met with it.

In this charming spot *Arion* was far from uncommon, and I sometimes saw three or four specimens at the same time. As a rule they flew slowly and lazily about the low herbage, or settled on the wild thyme, but occasionally they rose higher and flew swiftly about among the trees, out of reach of the net. Although generally a gentle flyer and easily taken, I found that when frightened they were tolerably strong on the wing, and often led me a long round before consenting to be captured.

I marked down several females which alighted on wild thyme, in

the hope of seeing a specimen in the act of oviposition, and securing eggs, but although I carefully examined the sprigs of thyme on which females had alighted, I never succeeded in finding any eggs.

In addition to *Arion*, *Alexis* and *Agestis* were both common, as was also *Acidalia ornata*, and *Limacodes testudo*, and *Ptatypteryx unguicula* flew swiftly about among the beech trees. Insects as a rule, however, were very scarce, and nothing worth mention was obtained by beating.

In the course of three hours spent in the new locality I netted about forty specimens of *Arion*, but as several of them were worn or chipped I set them at liberty. Notwithstanding this I found by 2-30 p.m. I had more than thirty beautiful specimens safely pinned in my box, and as by this time, after five hours' hard work in an almost tropical sun, I felt tolerably used up, I decided to move on into the nearest village about a mile away to the west, where my companion and our carriage had already preceded me. After an excellent lunch, to which we did full justice, and a pipe, we returned to the *Arion* locality, but as it was then nearly 4 p.m. I only secured two or three more specimens that day. On the following morning, bearing in mind the old proverb about the early bird and the worms, I was on the ground by 9 a.m., and in the course of two hours netted over two dozen specimens of *Arion*, several of which, however, I set at liberty. By 11 o'clock the heat had become so intense that all the *Arion* had disappeared, and although in the early morning they had been comparatively common, yet after this hour I vainly sought for a specimen.

One noticeable peculiarity about the *Arion* from this district was, the very small size of many of the specimens, nearly a third of those I captured being far below the average size, and several of them were not larger than *Alexis*. I did not find the small form confined to one sex, nor to any particular portion of the district, and I not unfrequently captured a male of the small form in *copulâ* with a female of the larger form, and a male of the latter form in *copulâ* with a female of the former.

Having secured a good series of *Arion* in the course of my two days' collecting, and being anxious to spare this local species as much as possible, I determined not to spend a third day on the same ground, so having packed up my bag and secured a conveyance, I returned to head-quarters in the afternoon, thoroughly pleased with the beautiful scenery of the hills and the result of my expedition.

On the following morning I started alone for a new district, some fifteen miles to the south-west, where my correspondent had informed

me that *Arion* was not uncommon, and where *Acis* had several times been taken. The locality to which I had been directed was situate at the top of a steep hill, the lower portion of which was thickly wooded with beech. The hill top commanded a most extensive view of the surrounding country, including the vale and estuary of the Severn, with the Forest of Dean in the north-west. The locality looked most promising, but not a single specimen of *Arion* did I see there during the three hours which I spent in it. *L. Alsus* was extremely abundant, indeed far more so than I have ever seen it on the chalk, either in Kent, Sussex, or the Isle of Wight. *Adonis* and *Agestis* also occurred, the latter in some plenty, though less abundantly than *Alsus*. I had always associated *Alsus* and *Adonis*, especially the latter, with the chalk; and I was surprised to find them occurring abundantly in this locality, situated on the upper lias formation, with no chalk nearer than the Marlborough Downs, many miles to the eastward. Finding but little to interest me in the old quarries on the hillside, I descended into the woods, where *Chelonia plantaginis* was flying swiftly about in the open places. In addition to this species the following were observed: *Platypteryx unguicula*, *Setina irrorella*, *Ephyra trilinearia*, *Minoa euphorbiata*, and *Eupithecia exiguata*, besides those species of universal distribution which it is unnecessary to particularise.

In the evening I returned to head-quarters, having spent a very enjoyable, though, from a collector's point of view, a somewhat unprofitable day.

With the exception of the very local species, to see and capture which had been the main object of my expedition, there were but few good species to be found in the district, at any rate at that time of year, so partly for this reason and partly because I was anxious to be in the New Forest before the end of the month, I left for London early the next morning. After three hours' ride in the express I arrived at Paddington a little after twelve o'clock, and having deposited my treasures in safety at home, was soon on the South Western Railway *en route* for Lyndhurst.

The Avenue, Surbiton Hill, Surrey, 12th Feb., 1878.

THE VALUE OF THE STUDY OF ENTOMOLOGY.*

By W. E. SHARP.

IT will be universally admitted that the true functions of a local Natural Science Society are the investigation of the phenomena of nature as exemplified in its special district. We may, I think, con-

*Paper read before the Lancashire and Cheshire Entomological Society, Nov. 26, 1877.

gratulate ourselves that our Society has not failed in its duty in this respect. We have had many and able papers—the result of patient observation and diligent search—and all, more or less, with a decidedly local tendency. It is, therefore, a source of some regret that lack of sufficiently long experience in the field of nature, and want of time for adequate investigation into its details, prevent my adding another to the interesting monographs which our Society has produced. I am thus thrust back on the wider field of theory, and propose to-night, regarding our favourite study more from a subjective than an objective point of view, to consider more the bearing and value of entomology as a study, rather than to add anything to that study by a discourse on the subjects to which it relates; and I am the more desirous of elucidating such a line of thought from the feeling that it would be well if we could all recognise the exact value and influence of practical natural science—more especially in its relations to the insect world—in its philosophical character, not less than merely as a recreation. Perhaps it may be thought something very like waste of time to defend a study whose value our presence here is a proof that we all appreciate, but at the same time it might be thought worth while, by some, to consider for a short time the grounds on which we rest that appreciation, to assure ourselves that to the study of moths and butterflies it *is* really worth while devoting time, thought, and energy. No doubt many if not all of us have to contend with a vast amount of ridicule and derision, even from those whom we should otherwise consider wise and reasonable; it is but natural that ignorance should ridicule what it fails to comprehend, and vulgarly deride what it is too blind to appreciate; these we can afford to smile at. No intellectual exercise is or ever was free from their attacks, and our special study being the object of such, only shows that we are somewhat elevated above the tastes and feelings of the masses; but when we are assailed by persons of undoubted intellectual capacity, men whose minds are accustomed to the pursuit of various forms of knowledge, who can think as freely and as much without prejudice as we can ourselves, perhaps more so,—and there are many such—when we are asked by these with perhaps a scarcely concealed smile at the peurile character of our pursuits—What is the real use of entomology, of getting together the worms and creeping things of the earth, and spending our energy over the acquisition of bright fragile bits of membrane in which the labour of years may be destroyed by one sweep of the arm?—are we always prepared with a ready and complete defence, alike satisfactory to ourselves and undeniable by

our assailant ? Is there really any practical good, mental, physical, or material—are we, or the world at large any the better, more advanced on the great road of progress, for such things as these ? I trust there are, else we should have to lament many a wasted hour and misused energy. But there are many phases of any natural study, in its mental effects particularly, where study and recreation are joined, and to a consideration of some of these a short time may perhaps be not disadvantageously bestowed ; and to begin with, we can hardly I think dignify entomology with the name of a science, it is more a part of the groundwork on which science is built, than science itself in its purest form. The true man of science regarding the facts brought to light by the entomologist, the ichthyologist, the botanist, and the rest of them, seizes the labours of them all and with comprehensive grasp and instructive perception raises on such a foundation those stupendous theories and sublime generalizations by which we may in some slight manner answer the whys and the wherefores of nature, and obtain some faint glimpse into the working of those eternal laws and that adaptability of design to purpose on which the grand unity of creation is moulded. But entomology is only an investigation of the facts connected with that special branch of nature to which it relates, it merely answers the question what and how, it can of itself never answer the why, and in this character of investigation, entomological research regarded simply by itself, is in no respects different from the study of any other special part of creation ; and yet it would be wrong to infer that the value of simple investigation and record is less than the theoretical utilization of such investigation. The one would be in fact impossible without the other, and the more numerous and accurate the facts recorded of nature are, of just so much the more value are the deductions derived therefrom. Possibly the labours of the simplest worker in the field of nature may be of vastly more importance than those of the most accomplished theorist, if he be nothing more than a theorist ; such a man for instance as Edward of Banff, born in the humblest sphere of life, trained in the hard school of poverty and manual toil, without education, without books, without friends or any sympathy, yet unequalled as a close and patient observer of the way in which nature works. As a collector of her varied forms of life, and as an investigator into her minutest details, this man, although no disciple of science, yet because simple fact was his aim and truth his end, has contributed to the great sum of human knowledge more abundantly than many who claim the prouder title of purely scientific men.

This character, then, of recorded investigation is perhaps the highest in which we can regard our favourite study. But yet we should insist on the value of entomology even if its facts died with their discoverer. The world is made up of individuals, and an increase of good to any one individual must therefore be a gain to the world at large. And will anyone say that the simple acquisition of knowledge is without advantage to any mind, even if it should lead no further? There is, in truth, a very pure delight in the simple discovery of a fact new to ourselves, even if that fact has been known for ages to others, and there are few studies calculated to put one in possession of more interesting facts than that of entomology. To trace out for ones-self the life history of an insect by laborious research, and to watch it through all its varied and multiform transformations, are pursuits of engrossing interest, and cannot be without their good effects on the human mind, even if the knowledge thereby gained go no further than the gainer himself, particularly if the secrets of insect anatomy be made an object of study, the wonderful adaptation of structure to function, and modification of special organs for special purposes—these must teach a man, far more eloquently than any book, that there is in nature a plan and a fixity of purpose, and that the smallest atoms of creation are constructed as perfect in mechanism, and as exact in detail, as those objects which are generally considered as the highest efforts of creative power.

But it may be said, "Thus far we agree with you wholly. You have, as yet, only considered entomology as a searching into and discovering of the facts relating to a special part of the natural creation; but if such be the case, where the need of those vast collections of insects which it is our pride and delight to capture and preserve?" We see here a desire for the acquisition of specimens far more strong than a desire for the acquisition of knowledge. I am afraid there is sometimes ground for such an insinuation, and, without disparaging the value of collecting, we must be careful that our motive for making these collections is not the mere love of hoarding up specimens—the *amor habendi* of the collector of postage stamps, coins, autographs, old and ugly china, or all the untold curiosities that people do collect. It may be true that the entomologist must needs also be a collector, but it is also most abundantly certain that there is no necessity for the collector to be an entomologist.

(To be continued.)

NEGLECTED ORDERS.

BY H. FRANKLIN PARSONS, M.D., F.G.S.

THE thanks of your readers are, I am sure, due to Mr. Mosley and Mr. Roebuck for their very useful and practical articles on the collection and study of the Diptera and Hymenoptera respectively. Mr. Roebuck's bibliographical references are especially valuable. I sincerely trust that some of the members of the Yorkshire Naturalists' Union may be induced to explore the new and wide fields into which these gentlemen have shown the way, and of the vastness of which few of us probably have an adequate idea. I hope also that the other orders of insects—Neuroptera, Orthoptera, Hemiptera, &c.,—may find equally worthy champions and ardent students, as the interesting structure and habits of these insects and the importance of them to mankind, well merit that they should do. But I wish to point out that even if *all* the orders of insects were studied, there still remain whole classes of animals, to be found everywhere, and well deserving of our study, which nevertheless are, I fear, almost entirely neglected by the vast majority of our naturalists : as examples I need only mention the Arachnida, Myriapoda, Crustacea, and Annelida. Who will take charge of these "neglected orders," and tell us something about their wonderful forms and life-histories ? I feel sorely tempted to "go in" for some of them myself, but the "neglected orders" of the vegetable kingdom are already more than enough for one student. The most feasible way of working up these recondite branches of Natural History appears to me to be for each of a number of competent workers to make *one* of these classes his special study, and to act as "recorder" for it. He should provide himself with the necessary books (in some special cases it might be advisable for the Union to procure books), and he should endeavour to get into correspondence with the best authorities on his subject, in order that he may have some one to fall back upon in doubtful cases, and to verify new discoveries. To such a "recorder" the secretaries of sections, and of the local societies, or individual workers should forward (carriage paid) any specimens belonging to his department which might come into their hands. For instance, species of Crustacea and Myriapoda must be continually coming under the eyes of our conchologists, entomologists, and other members ; as it is, no notice is taken of them, but if it were known that any one devoted his special attention to these groups, many of us would no doubt be

glad to save such specimens for him. Each specimen, as both Mr. Mosley and Mr. Roebuck very properly insist, should be accompanied by a note showing when and where and in what sort of place it was found, and it might also bear a number or mark, to be quoted by the recorder in giving the name, a similar mark being placed on a duplicate specimen retained by the sender; or, if wished, the original could be returned. In this way, one's being debarred by want of means or of linguistic attainments from access to the standard books, need not prevent him from forming a very creditable *named* collection of one of the "neglected orders"; while from the increased number and inter-communication of workers, science could hardly fail to gain solid additions—and to enlarge the bounds of human knowledge is surely a higher object of ambition for a working-man naturalist even than to construct the royal arms in butterflies.

Goole, May 3rd, 1878.

Short Notes and Queries.

FISH DISEASE IN THE BREAM, AT WALTON HALL.—About four weeks ago, my attention was drawn to a bream of large size swimming at the top of the water under the bridge here. It was observed to be covered with white blotches, and apparently in a weak state of health, and from the description of the salmon disease in the river Eden in the Journal, it now appears to be of a similar character. Within ten days after the observation more than 100 bream of considerable size were found floating dead on the lake, affected in a similar manner. The disease seemed to break out suddenly and as suddenly ceased, nor was there any circumstance as regards the water which could reasonably account for the outbreak.—
EDWIN HAILSTONE, Walton Hall, 4th May.

NATURAL HISTORY NOTES—E. RIDING.—On April 20 I was in the neighbourhood of Holme-on-Spalding-Moor and Market-Weighton. Mosses and lichens were plentiful in that district, the tree trunks being covered to a considerable extent, reminding one of the west of England. In an old pine wood *Leucobryum glaucum* formed large hemispherical tussocks as big as an anthill. When young, these tufts lay loose on the surface of the ground, which was covered with fir needles, and the stems grew in every direction from the centre, even the flat under surface of the tufts presenting, not roots, but leaves pointing downwards. *Plagiothecium undulatum* and other mosses were equally luxuriant. Several kinds of mosses rarely fertile were in fruit. *Hypnum cuspidatum* bore abundant, though immature, capsules in many of the pits and springs near Holme. *H. splendens* and *H. triquetrum* were in fruit on the sides of a gravel-pit about half a mile east of Holme Beacon. A pond in the same pit was fuller of infusoria, desmids, &c., than any water that I remember to have seen. This part of the East Riding well deserves exploration in botany,

geology, conchology, and indeed all branches ; and I would recommend any Yorkshire naturalists who may have a day or two to spare before the Union meeting at Brough, to work their way thither through the neighbourhood I have mentioned.—H. FRANKLIN PARSONS.

ARRIVAL OF MIGRANTS DURING APRIL.—Swallow April 13th, wheatear 8th, willow wren 10th, cuckoo 27th, redstart 20th, sand martin 20th, martin 21st, flycatcher 22nd.—F. G. S. RAWSON, Halifax.

Rainfall for April.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1878.	1877.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	350	1·41	...	7·05	* 10·40	20	0·65
WAKEFIELD ... (F. Hill).....	120	1·89	11	5·84	...	20	1·10
LEEDS ... (H. Crowther) ...	183	2·13	11	6·95	...	20	1·34
HALIFAX... (F. G. S. Rawson)	360	2·00	8	12·53	20·53	...	...
BRADFORD... (J. A. Douglas, [F.M.S.]	415	1·14	12	7·90	12·81	20	0·70
BARNESLEY ... (T. Lister) ...	350	1·64	13	5·70	12·43	20	0·78
INGBIRCHWORTH (do.)	853	1·75	12	7·65	15·57	20	0·68
WENTWORTH CASTLE (do.)...	520	1·60	11	5·17	14·15	20	0·76
GOOLE ... (H. F. Parsons) ...	25	1·05	11	3·73	8·40	20	0·31

* This is the average to date for 12 years, 1866-77.

Reports of Societies.

BARNESLEY NATURALISTS' SOCIETY.—Meeting May 10th, Mr. T. Lister in the chair.—Additional arrivals of migrants were recorded, the last being the grasshopper warbler April 22, sedge warbler 26th, whinchat and wood wren May 3rd, sandpiper 11th. Of scarce birds, goldcrests, kingfishers, and a few gulls and Canada geese have been seen.

BRADFORD NATURALISTS' SOCIETY.—Meeting April 30th, the president in the chair.—Messrs. Carter, Saville, Illingworth, Andrews, Bamford, Soppitt, and West gave descriptive accounts of rambles they had had since the last meeting. Mr. Carter exhibited some larvæ of *S. belgiaria* and *Tripæna fimbria*. Mr. Soppitt reported the cuckoo for April 27th.

MEETING May 14th, Mr. Firth in the chair.—Mr. West gave a paper on "Grasses," which was illustrated by above 100 species of that family. He showed that it was by far the most important of all the orders of

plants to man, as from it we either directly or indirectly derive nearly all our food. The plant most useful to man is *Oryza sativa*, the common rice plant, about 50 varieties of which are cultivated as food for man. This grass supplies more people with food than any other kind in the world. The distinction between grasses and allied orders was pointed out. The first part of Mosley's work on European Butterflies was shown; it pleased the members exceedingly. Mr. Firth reported the wood wren and house martin for May 4th, also the yellow wagtail, garden warbler, and sedge warbler for May 12th. Mr. Carter reported *H. impluviata* from Gilstead, and *N. pulveraria* from Hawksworth, both of which are new to the district. Messrs. Soppitt and West showed *Stellaria nemorum*, *Scirpus pauciflorus*, *Prunus Padus*, *Ribes rubrum*, *Potamogeton crispus*, *Pyrus Aria*, *Geranium phænum*, *Ranunculus Lenormandi*, &c.—WILLIAM WEST, Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting May 10th, Mr. G. T. Porritt, president, in the chair.—Mr. James Varley exhibited a specimen of the lessser whitethroat, killed by flying against telegraph wires on May 5th; he also showed living specimens of *Bombyx cecropia*, reared from cocoons from America; also a valuable series of the male of *Saturnia carpini*, taken a few days previously; one of them was a particularly dark specimen. Mr. S. D. Bairstow, a box of lepidoptera recently taken in various parts of North Wales, including *Lycaena Argiolus*, *Thecla rubi*, *Hemerophila abruptaria*, *Cidaria suffumata*, &c. The chairman, living larvæ of *Anchocelis lunosa*, *Scopula olivalis* (on *Lamium*), *Myelophila cri-brella* (in thistle stems) and also some larvæ in *Aira cæspitosa*, supposed to be those of *Miana furuncula*, received from Mr. J. Gardner, of Hartlepool. Mr. S. L. Mosley showed larvæ of *Satyrus Semele*, *S. Janira*, and *Procris Geryon*, also from Hartlepool; also the following Hemiptera-homoptera, taken at Sherwood Forest in April, *Psylla pineti* and *Trioza hæmatodes*. The first part of Mr. Mosley's "Illustrations of Exotic Butterflies" was also on the table, and gave universal satisfaction, it being considered that the execution of the plates could not be surpassed. Mr. G. Brook ter. showed the following mosses from the Eden district:—*Weissia crispula*, *W. viridula*, *Funaria fascicularis*, &c.; also a diseased fish, in corroboration of the remarks contained in his paper read at the last meeting. He said exception had been taken to his statement that the fungus killed the fish rapidly, but the fish exhibited had only died the day before, and there was no trace of fungus until five days previously. The mouth was completely crammed with fungus, although it had commenced in the fins. Mr. Byram Littlewood shewed eggs of perch with the microscope. The development appeared to be much more rapid than in the trout, and at the end of about fourteen days (as exhibited) the fish was very lively, and could be distinctly seen to very often turn completely round within the egg; the embryo trout, on the contrary, seemed able to move but very little. At the close of the

meeting, at the invitation of Mr. Littlewood, most of the members proceeded to his house to examine the breeding tanks, the whole working of which he explained. They were on the circulatory system, and with close attention he had been unusually successful in hatching and rearing fish, and had turned some thousands of trout into the Corporation reservoirs at Blackmoor-foot and Deerhill.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Monthly meeting 29th April, Mr. S. J. Capper, president, in the chair.—The president read a paper entitled “Reminiscences of Lepidoptera-collecting 35 years ago,” in which he contrasted the difficulties then existing with the facilities now pertaining to the pursuit of entomology. He commented on the literature of the science, then and at present, compared the methods of capturing and preserving specimens, and related his early experience as an entomologist. An interesting letter from Mr. E. Dukinfield Jones, of San Paulo, addressed to Mr. T. J. Moore, giving an account of his captures of larvæ and lepidoptera in the Brazils, was read.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—286th meeting, April 30th, Mr. Edward Thompson in the chair.—Lecture by Mr. James Abbott, on “The Changes undergone by an Ovum.”

287TH MEETING, May 7th, Mr. Samuel Jefferson, F.C.S. (v.p.) in the chair.—Mr. Smethurst presented to the local collection Armley specimens of *Eupithecia venosata*, and Mr. Nelson gave *Bulimus obscurus* from Went Vale, *Clausilia rugosa* from Stapleton Park, and *C. laminata* from Little Smeaton ; Mr. J. W. Fawcett exhibited *Paris quadrifolia* from Harrogate ; Mr. J. W. Westmoreland, A.R.S.M., sent a frond of *Asplenium viride* from Twynangwynion, Breconshire ; Mr. C. H. Bothamley showed bornite and copper glance, from Norway ; spiegeleisen containing 15 per cent. of manganese, &c. Mr. Charles Smethurst stated that he saw swifts and swallows on the 29th April. Mr. F. G. S. Rawson reported (by letter) willow wren on April 10th, and wheatear a few days previous. A coot was killed near his place the week previous, for which deed a summons to the West Riding Court at Halifax was issued.

288TH MEETING, May 14th, Mr. C. H. Bothamley in the chair.—Mr. Henry Pocklington, F.R.M.S., gave a lecture on “Some uses of the Telephone.”—W.M. DENISON ROEBUCK, Sec.

STAINLAND NATURALISTS' SOCIETY.—Monthly meeting at Burwood, Mr. E. Garside in the chair.—Messrs. C. C. Hanson and W. H. Stott placed a large number of botanical specimens on the table ; Mr. Fakes showed an adder from Suffolk ; Mr. B. Garside, eggs of the blue tit. The arrivals of summer migrants were given in by the members as follows :—Wheatear April 4th, Ray's wagtail 14th, willow wren 14th, tree pipit 13th, sand martin 16th, swallow 21st, cuckoo 23rd, lesser

whitethroat, garden warbler, sedge warbler, and whinchat May 4th, and greater whitethroat May 5th.—W. H. STOTT, Sec.

WAKEFIELD NATURALISTS' SOCIETY.—Meeting May 2nd, Mr. Lumb, v.p., in the chair.—Mast. H. Shaw exhibited a quantity of eggs—one a variety of chaffinch, Mr. Wormald a variety of blackbirds' eggs, Mr. Sims *O. pudibunda*, *B. hirtaria*, *A. betularia* (var. type), *O. sambucata*, and larvæ and pupæ (all bred): Mr. J. Wilcock, amongst others, *Agriotes lineatus*, *A. obscurus*, and *A. pilosus*; Mr. Fogg, skins of short-eared owl, dotterel, ruff-and-reeve, and fieldfares.—J. W. SHAW, Corr. Sec.

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—Monthly meeting April 10th, Mr. Wm. Chapman, v.p., in the chair.—Mr. T. Humphries read a very interesting paper on "Four Species of Arctic Gulls," giving a graphic description of the habits, food, &c., of these curious sea-birds. Mr. G. Bacon exhibited the following birds' eggs:—Red grouse, wild duck, red-backed shrike and quail; Mr. Dutton, *Teniocampa populeti* and *Nyssia hispidaria*; the hon. secretary, *Xylina semibrunnea*, taken by himself at sallow bloom, March 16th, at Darenth Wood, near London; *Selenia illustraria*, bred this season; a fine series of *Argyrolezia Eneana* and *Ablabia argentana*, the latter species recently discovered in Scotland, and taken by Sir Thomas Moncrieff in Perthshire.

MONTHLY MEETING, May 8th, Mr. M. Smith in the chair.—Mr. Ripley exhibited, on behalf of Mr. Ald. Melrose (one of the vice-presidents), a remarkable example of the starling, *Sturnus vulgaris*, shot by that gentleman at Clifton Croft, April 21st, which, instead of being the usual colour, was a dirty white, or light stone colour; Mr. G. Bacon, eggs of the golden plover, *Charadrius pluvialis*, and the shag, *Phalacrocorax cristatus*; Mr. Wm. Simmons, larva of *Urapteryx sambucata*, very finely preserved; Mr. Webster, specimens of *Hypnum imponens* taken by himself on Strensall Common; the hon. secretary, a fine specimen of the rare beetle, *Carabus nitens*, also taken on Strensall Common May 4th; a specimen of a very rare British moth, *Phibalapterix lapidaria* from Scotland; and one of *P. polygrammata*, another rare species. The Transactions of the Entomological Society of London were presented to the Society by Mr. G. T. Porritt, F.L.S., of Huddersfield, and a vote of thanks to that gentleman was passed.—WM. PREST, Hon. Sec.

THE YORKSHIRE NATURALISTS' UNION.—The opening meeting for 1878 was held on Easter Monday, April 22nd, at Pontefract, for the investigation of Went Vale. This beautiful valley was traversed by various parties starting from Pontefract, Tanshelf, Norton, Womersley, South Elmsall, and Wakefield Stations. At the general meeting, which was held at the Red Lion Hotel, the chair was occupied by the president, Mr. H. Clifton Sorby, F.R.S., &c., of Sheffield. There were about eighty members present, representing the Huddersfield, Heckmondwike, Clayton West, Barnsley, Wakefield, Stainland, Holmfirth, Liversedge, Mirfield, Honley, and Bradford Naturalists' Societies; Leeds Naturalists'

Club and Scientific Association ; Goole Scientific Society ; Huddersfield Literary and Scientific Society ; Huddersfield Scientific Club ; Conchological Society ; Sheffield Naturalists' Club ; Bradford Scientific Association ; and Batley Field Naturalists' Society. A list of fourteen new subscribers to the funds was read, and thanks voted. The reports of sections were then taken. Mr. J. W. Taylor, secretary of the Conchological Section, reported that the day's excursion had been a very successful one, thirty-eight species and two well-marked varieties having been found, the most remarkable being *Clausilia laminata*, which has not previously been recorded for the district, and was found commonly amongst stones near Smeaton ; another interesting form was *Clausilia rugosa* var. *albida*, of which several specimens were taken at the same place. A number of examples of *Vertigo minutissima* were found attached to the face of the rocks at Wentbridge, and according to the observation of Mr. W. Wilson they prefer those parts where *Thymus serpyllum* grows. Other species found were *Helix lapicida*, *Achatina acicula*, *Zonites fulvus*, &c. *Limnaea glabra*, obtained by some of the members at Rawcliffe, was brought to the meeting. Mr. Geo. T. Porritt, F.L.S., of Huddersfield, secretary of the Entomological Section, reported that very little had been done in that section, it being too early for the district. A number of species of lepidoptera, coleoptera, and hemiptera-homoptera had been taken by Messrs. John Grassham, E. B. Wrigglesworth, C. W. Richardson, Brady, Porritt, and others, but, unless amongst species undetermined, none of any note. Dr. H. F. Parsons, F.G.S., of Goole, secretary to the Botanical Section, reported that 156 flowering plants had been observed during the day—a number greater than at either of the three first meetings in 1877. This was attributed to the richness in plants of the neighbourhood of Wentbridge, and partly also to its being well known, so that members knew where to look for rarities. Along the sides of Went Vale, between Wentbridge and Smeaton, a characteristic limestone flora was met with, among the species being *Potentilla verna*, *Asperula cynanchica*, *Hypericum montanum*, *Lactuca muralis*, *Astragalus hypoglottis*, *Inula Conyzza*, *Galium Mollugo*, *Geum rivale*, *Sison Amomum*, *Cynoglossum officinale*, *Viola hirta*, and *Cerastium arvense*. The tract of new red sandstone about Whitley yields a different group of plants—sand-loving species such as *Chærophyllyum Anthriscus*, *Teesdalia nudicaulis*, and *Ornithopus purpusillus*. Of denizens, and others of more or less doubtful indigenousness, were noted *Helleborus fætidus*, *Smyrnium Olusatrum*, and *Sedum reflexum* at Smeaton, and *Berberis vulgaris* and *Veronica Buxbaumii* near Wentbridge. The oxlip *Primula vulgaris*, β *caulescens*, was found in two or three places, in one with reddish flowers : in two at least of the stations it was growing with the cowslip and the primrose,—favouring the idea that the oxlip is a hybrid between those two plants. Of mosses, 51 species were found, including *Didymodon rubellus* (fr.) *D. luridus*, *Trichostomum tophaceum*, and *T. mutabile*, *Tortula aloides* (fr.) *T. rigidula*, *T. convoluta* (fr.) *T. tortuosa*, and *T. intermedia* ; *Encalypta*

vulgaris (fr.) and *E. streptocarpa*; *Grimmia apocarpa*, *Zygodon viridissimus*, *Bryum capillare* (fr.) *Fissidens adiantoides* (fr.) *Leskeia polycarpa* (fr.) *Anomodon viticulosus*, *Hypnum lutescens*, *H. striatum*, *H. tenellum* (fr.) *H. murale* (fr.) *H. rusciforme*, *H. denticulatum* (fr.) *H. molluscum*, and *H. chrysophyllum*. The Hepaticæ found were *Plagiochila asplenioides*, *Jungermannia bicuspidata*, *Lophocolea bidentata*, *Madotheca platyphylla*, *Fegatella conica*, and *Marchantia polymorpha*. About 18 lichens were found, including *Placodium candicans* and *murorum*, *Squamaria saxicola*, *Pannaria nigra*, *Verrucaria rupestris* and *nigrescens*, *Collema melænum*, &c.; and seven fungi, including *Agaricus sub-balteatus*, *Morchella esculenta*, and *Æcidium violæ*. In the absence of the officers of the Geological Section, Mr. Sorby, F.R.S., presided at the sectional meeting, and Mr. C. H. Bothamley, of the Yorkshire College, Leeds, acted as secretary. Some well-preserved fossils from a block of magnesian limestone in Went Vale were exhibited, also some specimens showing a peculiar appearance produced by two surfaces of magnesian limestone dovetailing very irregularly into one another. It was mentioned that in the Knottingley and Swinton railway cutting there might be seen good sections of the coal measures with several faults. Magnesian limestone was the only rock visible in Went Vale. Mr. Thomas Lister, Barnsley, secretary of the Vertebrate Section, reported 23 resident birds observed by different members during the excursions; there were also observed of swimming birds the common and herring gull. Of spring migrants 12 were observed; of those not hitherto reported by him this season were the common whitethroat, lesser whitethroat, blackcap and grasshopper warbler. Next to the willow warbler, the most numerous was the chiff-chaff; it was remarked by Mr. Lister, and also by Mr. Grassham of Leeds, that never in their varied experience had they noted so often this little warbler's two-fold call. Of other vertebrate animals reported, there were the water vole, water shrew, and squirrel (a young one of the latter being placed alive on the table), the pike, and the eel. On the motion of Mr. Arthur R. Kell, C.E., Barnsley, seconded by Mr. James Fogg, Wakefield, and after a discussion, in which Mr. C. H. Bothamley (who read a memorandum of the views entertained by the Leeds Naturalists' Club, on the subject), the secretary, Mr. Porritt, Mr. E. E. Prince, of Leeds, Mr. Lister, and Mr. W. Cash, F.G.S., of Halifax, took part, it was resolved that a combined exhibition of natural history objects and scientific apparatus be held in Leeds during the week of the annual meeting (since fixed for January, 1879). Messrs. H. C. Sorby, Geo. Brook, ter., C. P. Hobkirk, and T. Lister were then requested to join in the invitation to the British Association to meet in Sheffield in 1879. At the suggestion of the president it was agreed to consider at the next meeting the desirability of appointing a Publication Committee. Dr. Parsons informed the meeting that a Natural History Society is now forming at Hull, whereupon it was resolved that they be invited to join in the meeting at Brough.—W. DENISON ROEBUCK, Sec.

Diary.—Meetings of Societies.

- June 1. Cambridge Entomological Society—Excursion to Wicken Fen.
,, 4. Bishop Auckland Naturalists' Club. Liversedge Naturalists'. Leeds
Naturalists' Club, &c.
,, 6. Yorkshire College Students' Association at Leeds.
,, 8. Huddersfield Naturalists'.
,, 10. Whit-Monday—Yorkshire Naturalists' Union—Excursion to Brough
Tea at Station Hotel, 4 p.m.; Sections at 5 p.m.; General
Meeting at 6 p.m.—H. Clifton Sorby, F.R.S., Chairman. Local
Secretary, H. Franklin Parsons, M.D., F.G.S., Goole.
,, 11. Leeds Naturalists' Club, &c. York and District Field Naturalists'
Excursion to Strensall Common from York Station; at 1 p.m.
,, 12. York and District Naturalists' Field Club.
,, 13. Yorkshire College Students' Association, at Leeds—Paper on
“Aquara”—Mr. M. A. Brigg. Conchological Society of Great
Britain and Ireland, at Leeds.
,, 14. Huddersfield Scientific Club.
,, 17. Leeds Geological Association, Annual Meeting.
,, 18. Leeds Naturalists' Club and Scientific Association.
,, 20. North Staffordshire Naturalists' Field Club, Excursion to Bridg-
worth.—Leader, Mr. J. Ward.
,, 21. Yorkshire College Students' Association, Annual Meeting.
,, 24. Lancashire and Cheshire Entomological Society, Huddersfield
Naturalists'—Paper: “Commercial Uses of Lichens.”—J.
Mackenzie.
,, 25. Leeds Naturalists' Club and Scientific Association—Paper by Mr.
John Garbutt.
,, 27. Conchological Society of Great Britain and Ireland.

Books, &c., RECEIVED.—*Midland Naturalist* (May), *American Journal of Microscopy* (April), *Science Gossip* (May).

COMMUNICATIONS RECEIVED from S. D. Bairstow, F. Arnold Lees, F.L.S., J. H. Threlfall, H. F. Parsons, M.D., F.G.S., and others.

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I should be extremely obliged if any lepidopterist, having striking varieties of any species, would kindly lend them for figuring for publication.—S. L. Mosley, Primrose Hill, Huddersfield.

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Original Articles.

LIMAX TENELLUS AND *ANODONTA CYGNEA*, VAR. *INCRASSATA*, IN SCOTLAND.

BY JOHN CONACHER, JUN.

WHILE searching for shells in the hedge bottoms near Irvine, in Ayrshire, last month, I was astonished at the great numbers of a yellow slug that I had never seen before, and not having any book of reference at hand, there was no chance of making out the species. Mr. J. Whitwam having joined me shortly after, we had a joint inspection of the animal, and he (Mr. Whitwam) felt convinced that it was *Limax tenellus*. In the meantime I collected about a dozen for future reference and examination, and on returning home took the first opportunity of comparing it with the plate in Forbes and Hanley's "British Mollusca," and the comparison fully confirmed Mr. Whitwam's judgment in the matter. The colour of the animal is, as already mentioned, yellow, and I found to my sorrow that it is not a fast colour, but only a yellow mucus thrown off by the animal; but it cannot be for the purpose of avoiding detection, as it only causes the animal to be the more easily seen. Having put those I had collected in spirits, the yellow matter was soon dissolved, and the animal was left a dirty bluish colour. I have also examined the shield with the microscope, and have not the slightest doubt that it is *Limax tenellus*. When Forbes and Hanley's work was published, there had only been one found in the British Isles; so that Jeffreys, when compiling his work on "British Conchology," did not give it a place amongst British species. At the same time he quotes what Forbes and Hanley had said on the matter, but in his supplement to the above work he gives it a place as a British species, and gives North Mauvine, Shetland, as the locality where it may be found, only he does not say whether it is rare or plentiful. It appears so far to be entirely a northern species, the first one having been found in Northumberland; there is no record of any having been found in the southern or midland counties; but it is just possible it may turn up in many places, both north and south, as there are very few who care to collect that genus, and the consequence is they are overlooked. I have just to add that we observed *Limax tenellus* also in the island of Bute, near Rothesay.

We also collected another rare mollusc at Irvine, in the river Irvine,—this time a bivalve, *Anodonta cygnea*, var. *incrassata*, the same variety that we found in Nostel Priory lake last summer. I am glad to have to record this genus from Scotland, and this variety especially, as Jeffreys gives no specific district where they may be found, but just lets us know that they occur as far north as Banff. I have at various times investigated many of the watercourses, ponds, &c., in Banff, Murray, Forfar, Perth, and the Lothians, but this is the first time I have met with this genus in Scotland. Of course there is still ample room for investigation, and it is possible it may yet be found in some of the counties just named.

THE REASONING OR NON-REASONING POWERS OF CATERPILLARS.

BY S. D. BAIRSTOW.

[ABSTRACT.]

THE object of this paper (which was read before the Huddersfield Naturalists' Society) is to controvert the conclusions arrived at by Mr. S. Everard Woods, in his paper published in the *Naturalist*, vol. ii., pp. 97 to 104.

Mr. Bairstow opens his paper with some remarks on Instinct and Reason generally, and then demands who can define where the one ends and the other begins, quoting two authors, one of whom (Mr. Woods) conceives that "caterpillars are impelled by a higher and more effective agency than instinct"; whilst another says:—"In no sense whatever can they be complimented with the faculty of reason or its equivalent, but they are guided solely and unconditionally by the voice of Nature, by the gnawings of hunger, the terrors of approaching evil, and preparing mechanically for the varied metamorphoses through which they pass." To this latter class Mr. Bairstow says he belongs. "Reason discerns and acts—instinct acts only; reason meditates and draws inferences—instinct operates mechanically. The most able scientist cannot produce a theory of universal satisfaction to demonstrate what is that higher power than reason which the male *Carpini* exhibits in its pursuit of love, travelling fleetly over acres and miles, attracted by some incomprehensible power pertaining to its better half," referring to the experiment given by Mr. Woods (*loc. cit.* 103). He also refers to Mr. Woods'

experiment with the goat-moth larva, extricating itself from the inside of a tumbler glass by means of a ladder spun by itself up the side of the glass. This action he does not consider as an exercise of reason, or anything akin to it, "but as merely prompted by a mechanical sense of danger mechanically obeyed," or, in other words, we presume, *reflex action*. He says different individuals of human beings, gifted with reason, and having different sizes and qualities of brain, would have different ways of getting out of such a dilemma; "but take 100 *ligniperdas*, and they would all act in precisely the same manner. Thus are they all gifted with the same quality of operative force.....The sensation of hunger is natural, but a larva in choosing food, in rejecting wrong plants and selecting right ones, displays instinct or its equivalent; and none of the other details given by Mr. Woods can possibly demonstrate even a limited capability of drawing deductions from premises. Young caterpillars act just the same as old ones, from instinct, but young children do not act the same as upgrown men. Insects adapt themselves to circumstances, to climates, to periods, but each insect would act in precisely the same manner under the same regulations, in nine cases out of ten.....If we grant the possession of reason to caterpillars, we must also allow their superiority over human beings, for with ourselves the acquisition of this grand boon is progressive.....but young caterpillars exhibit the same capabilities as their more aged kin." The paper concludes with some remarks on the question of varieties in insects.

THE VALUE OF THE STUDY OF ENTOMOLOGY.

(Concluded.)

By W. E. SHARP.

I do not here speak of those sordid individuals who look on everything in earth or sea or sky merely in the light of £ s. d., who mow down whole tribes in a campaign, and talk of their victims as an Indian might boast of his scalps—men, whose highest ideas of an entomological work are the priced catalogues of the dealers; and of an entomological triumph, the capture of some rarity which none of his neighbours has had the luck to meet with. These men only have the organ of acquisitiveness strongly developed—nothing more. The proper way to make or regard an entomological collection, if we are correct, is merely as an illustration of the special objects of our study, and inasmuch as we want that illustration as full and

complete as possible, we should spare no pains to make our collection a perfect one. A view of a collection of the species of any order of nature will give us a more real knowledge of that order than a perusal of all the descriptions ever penned on them ; we are able to see and to appreciate the nice distinctions and minute differences which divide species from species, and the beautiful harmony which runs through them all and unites them all into genera, and families, and groups, either end of the scale so dissimilar, each link so like the next. Without collections of the forms of nature we should have to draw conclusions from recollection and description, which, though carefully and accurately compiled, leave at best but a misty idea of the real thing in the mind, and certainly cannot make us realise those special characteristics, an intuitive perception of which it is one of the chief aims of the naturalist to cultivate. Moreover, there is an indefinite sort of charm, without speaking of its utility, in making a collection of any series of natural objects—a sense of extreme satisfaction in getting together kindred species, of filling up the blanks one by one in one's cabinet, each one getting more difficult to fill as the process of completion advances, and often the thirst for the possession of new specimens is far stronger than the unmixed desire to know something of the nature of what we are after. Yet the one necessitates, to some degree, the other ; no one who is not blind or senseless can well collect insects, even in the most superficial way, without getting a vast amount of real practical knowledge about their nature, habits, appearances, and resorts, and the best collector is he who looks furthest into the hidden places of nature, who obtains her answers to his queries by exerting the most vigilance, and patience the most inexhaustible ; and a person must indeed be of a stagnant temperament who, being a spectator of the various processes of nature as exemplified in the economy of her creatures, can refrain from admiring the manner and meditating on the cause.

But this brings us down a step lower, namely, that there is some value in the study of entomology, even if its disciple follows it as a mere recreation—simply as a sugarer for moths, or a catcher of beetles ; even apart from the contingent probability that from a mere collector he may develop into a true naturalist, the influences of nature cannot but be beneficial, even though their subject be unconscious of them. Will anyone assert that after the labour and heat of a day spent in the wearying occupations of the town, it is not in every way for the good, bodily as well as mental, of the working man, whether his work be of hands or head, that he spend his evenings among

woods and moors, surrounded by the solitude of nature; that every half-holiday or leisure day be devoted to the investigation of some special district, or the capture of some local insect, even although all his labour and trouble only result in a few cabinet drawers of dry and fragile insect forms—if useless to the world at large, at least capable of reproducing in the mind of the collector the memory of many a pleasant expedition, the triumph of many a long search crowned at last with deserved success, or the fears and hopes which attended the mixture of many a brood of rare and delicate larvæ.

It would be almost beside the point to speculate on the amount of evil such an occupation might save a man from; that would depend more on the character of the man himself than on any special virtue of entomology.

It might also be considered scarcely pertinent to the enquiry to claim as one value of the study of entomology, that it fostered in any degree the mechanical aptitude of its followers, although such might be the case; to say that it improved a man's power of discrimination, quickened his keenness of perception, inculcated very strongly the value of patience, the evils of a too impetuous or too easily discouraged temperament; that a quick eye was required for the capture, and a skilful hand for the manipulation of entomological specimens, and that such virtues as temperance, frugality, and early rising were thereby cherished: all this is true enough, but it is also true of a good many other pursuits besides the study of insects, and we may rather consider these qualities as the good effects arising from cultivating any harmless hobby than the special results of any one in particular.

We have now tried to consider the real value which is attached to the study of entomology under several phases of that study. We have seen that perhaps its highest character and nearest approach to a science is when taken as investigation into one special group of creation and diffusion of the knowledge so gained, but we have seen that this study is also valuable merely regarded in its results on the mind from the knowledge acquired by its pursuit, in fact to the *cui bono* of the sceptic that the best answer of the entomologist would be *sibi*.

Considering the study of insects in its character of collecting, we have tried to show that in this it is not without its value, whether such collections be regarded by themselves or as exemplifications of a higher study of which they form the illustrations; finally that even in its lowest phase of mere amusement, entomology is too elevating a pursuit to be ridiculed as puerile, and too useful to be disparaged as waste of time; that in fact this and societies like this have a good

and worthy mission in seeking to propagate a love for natural research, not because of any aid they may thereby give to the general course of science, but because by teaching the people to investigate the wonders of nature, to understand her perfect harmony, to appreciate her exquisite beauty, and to get some glimpse into her unfathomable mysteries, they may ennoble the individual and become the benefactors of the community.

ON MOSESSES.

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By WM. WEST.

WHAT is a moss? No one but a student of mosses is able to answer this question, for the great mass of people include under this designation small flowering plants such as the smaller species of saxifrage and stonecrop, as well as some seaweeds, and also all (or nearly all) the liverworts and lichens. I now mean to define what is meant when a botanist speaks of a "moss," and in doing so I shall of necessity touch upon the development and structure of this order of plants. There is a group of plants termed *Muscineæ*, which comprises the hepaticæ and mosses. The family of the hepaticæ is the only one likely to be seriously confounded with the mosses, and I must therefore endeavour to point out how we distinguish between the two divisions of the group *Muscineæ*. The group is distinguished by a sharply defined alternation of generations. The spores of most of the hepaticæ develop a sexual generation, which is self-supporting, but some of the hepaticæ and all the mosses develop a protonema, which may be termed a pro-embryo, and this produces a shoot giving rise to the sexual generation. This protonema has a confervoid shape, except in one or two instances where it is flattened. From this generation there arises in the female sexual organ a new generation caused by fertilisation—a very different structure, destined to produce asexual spores—it is called the sporogonium by Sachs, but is usually known as the sporangium, theca, capsule, or fruit. The sexual organs are antheridia and archegonia. The mature antheridium (the male organ) has either a longer or shorter stalk; the outer layer of cells forms a sac-like wall, enclosing a number of cells, from each of which an antherozoid is formed. The antherozoids are freed by the apical rupture of the antheridium; they are spirally-coiled threads, thicker at the posterior and tapering to a point at the anterior end, where the two long cilia arise. The archegonium (the female organ) has a

central cell whose protoplasm contracts and forms an oosphere ; above this a row of cells passes up the axis of the flask-shaped neck of the archegonium, and is continued as far as some cells which form the "stigma" of some writers. This axial row of cells breaks up and is transformed into mucilage before fertilisation, this mucilage swells and forces apart the four stigmatic cells, and forms an opening for the passage of the antherozoids to the oosphere. In the thalloid hepaticæ the sexual organs arise below the point of apical growth, from the prostrate thalloid stem or the superficial cells of the thallus, or in marchantiaceæ on specially metamorphosed branches. In the mosses and the leafy *Jungermannia* the archegonia and antheridia may be formed from the apical cell, the latter ones from its last segments, and this is probably the case in *Sphagnum*. Antheridia and archegonia are generally produced in numbers in close proximity, and are usually enveloped by later outgrowths of the thallus in the thalloid hepaticæ, but in the leafy *Jungermannia* and in mosses several archegonia are surrounded by a perichætium formed of leaves ; a male flower in mosses is generally formed thus, while the antheridia of *Sphagnum* and *Jungermannia* stand alone. There is also a so-called perianth round the archegonium in hepaticæ, but not in mosses. The asexual generation or sporogonium arises in the archegonium from the fertilised oosphere or oospore. An egg-shaped embryo is formed by continued cell-division, growing towards the neck of the archegonium. Its final form varies, for in *Riccia* (the lowest type) it is a globe, the outer cell forming the wall, the inner cells becoming spores ; but in all other cases differentiation takes place into a seta penetrating the bottom of the archegonium and the underlying tissue, and a capsule or theca turned towards the neck of the archegonium. The neutral portion of the archegonium continues to grow when the sporogonium is developing, and finally becomes the calyptra enclosing the sporogonium. In *Riccia* the sporogonium remains enclosed in the calyptra, but in the remaining hepaticæ it protrudes after the ripening of the spores by a sudden prolongation of the stalk, when it ruptures the capsule and disseminates the spores, which are mixed with elaters, the calyptra remaining at the base of the seta as a cup-like membranous structure. Now in mosses the sporogonium takes a spindle-like shape, and before it develops into a capsule, it detaches the calyptra at its base by upward pressure, and the seta penetrates the tissue of the stem, by which it is surrounded as a sheath, called the vaginula. The spores of the *Muscineæ*, except in *Archidium*, arise in fours, the mother-cells showing a rudimentary division into two,

previous to complete division into four. These mother-cells arise from the tissue of the surrounding cell-layers, and become isolated before the formation of the spores. The ripe spore is composed of the exospore and endospore, containing colourless protoplasm, grains of chlorophyll, starch, and oil.

(To be continued.)

Rainfall for May.

	Height of gauge above sea level.	Rain- fall.	No. of Days	TOTAL FALL TO DATE.		Date of heaviest Fall.	Amount of heaviest Fall.
				1878.	1877.		
HUDDERSFIELD (Dalton) ... (J. W. Robson)	350	4·88	22	11·93	* 12·38	28	0·66
WAKEFIELD ... (F. Hill).....	120	†	...	...	...	...	...
LEEDS ... (H. Crowther) ...	183	4·11	21	11·06	...	23	0·77
HALIFAX... (F. G. S. Rawson)	360	5·10	18	17·63	24·85	...	...
BRADFORD... (J. A. Douglas, [F.M.S.]	415	3·81	24	11·71	14·79	7	0·61
BARNESLEY ... (T. Lister) ...	350	3·19	22	8·69	15·87	6	0·63
INGBIRCHWORTH (do.)	853	5·26	25	12·91	20·10	11	0·85
WENTWORTH CASTLE (do.)...	520	3·40	22	8·63	17·39	11	0·56
GOOLE ... (H. F. Parsons) ...	25	2·51	22	6·24	9·77	6	0·29

* This is the average to date for 12 years, 1866-77. † No Returns.

Reports of Societies.

BARNESLEY NATURALISTS' SOCIETY.—Meeting June 6th, Mr. T. Lister in the chair.—Mr. A. Kell exhibited some rare and valuable eggs of the great sedge warbler, thrush-like warbler, Dartford, reed, and Sair's warblers, &c. Steps were taken to have an exhibition in July. The dates of migrants not reported before were : the nightingale April 24th, spotted flycatcher April 20th, land rail April 21st (these more numerous than in former years), wood warbler May 3rd, garden warbler May 4th, goat sucker May 14th, sandpiper May 12th, and swift May 13th.

BRADFORD NATURALISTS' SOCIETY.—Meeting May 28th, the president in the chair.—Mr. Carter showed *N. pulveraria* and *Y. impluriata*, new to the district. Mr. Firth showed some insects, amongst which was

Larentia salicata, from Shipley Glen, new to the district. Mr. H. Spencer showed a hawfinch, from Ripon.

MEETING June 13th, Mr. Firth in the chair.—Mr. Andrews exhibited some home-made microphones, the working and use of which he explained. Mr. Carter showed *Selenia lunaria*, new to the district. Mr. Crowther showed some Lyrie fish and a hermit crab, from Morecambe. Mr. Lambert showed *Emmelesia affinitata*, &c. Mr. Suthers showed *Platypteryx falcula*, *Lomaspilia marginata*, and *Acidalia candidata*. Mr. Firth gave a very interesting paper on the migration of birds.—WM. WEST, Sec.

GOOLE SCIENTIFIC SOCIETY.—An excursion was made on May 16th, jointly with the Selby Naturalists' Society, to Tickhill and Roche Abbey. Meeting at Doncaster, the united party drove by Loversall and Wadsworth to Tickhill, and thence through Sandbeck Park to Roche Abbey. At Tickhill the remains were examined of the ancient Norman castle, built on, and partly scarped out of, a mound of new red sandstone rock. The ruins of Roche Abbey stand in a narrow but picturesque valley, with rocky, wooded sides, formed of the lowest beds of the magnesian limestone, which yield a fine white stone extensively quarried ; the bottom of the valley cuts through the limestone to the coal measures. The woods around Roche Abbey abound with *Myosotis sylvatica*, and *Vinca minor* and other plants, possibly due to former cultivation, are found near. A heavy shower of rain somewhat interfered with collecting, but 53 flowering plants were recorded, the most noteworthy finds being *Helleborus viridis*, *Aquilegia vulgaris*, *Arabis hirsuta*, *Viola Reichenbachiana*, *Inula Conyzza*, *Gentiana Amarella*, *Veronica montana*, *Daphne Laureola*, and *Scopolendrium vulgare* ; 22 mosses were found, among them being *Didymodon rubellus*, *Tortula rigidula*, *T. convoluta*, and *T. ambigua*, *Encalypta streptocarpa*, *Mnium rostratum* (fr.), *M. stellare*, *Thamnium alopecurum*, *Brachythecium populeum* ; 5 hepaticæ, including *Jungermannia bicrenata* (fr.), *Plagiochila asplenioides*, and *Madotheca platyphylla*, and two or three lichens and fungi ; *Spongilla fluvialis*, and a few other aquatic animals, and some diatoms were found in the stream through the valley.—H. FRANKLIN PARSONS, Sec.

HUDDERSFIELD SCIENTIFIC CLUB.—Meeting June 14th, Mr. G. T. Porritt, president, in the chair.—Mr. C. P. Hobkirk showed *Splachnum sphæricum*, from Wharmpton Moor, near Greenfield. Mr. John Conacher a nice collection of plants from various localities in Scotland, gathered by himself during the last two months ; also the very rare *Limax tenellus*, found by himself in Forfarshire. Mr. S. D. Bairstow, a nice series of *Melanthis albicillata* and *Cidaria silacea*, from Bishop's Wood near Selby, a few days previously ; and recorded several specimens of *Anticlea badiata*, taken as imagos at the same time. He had never previously known the species out so late. Mr. S. L. Mosley, several specimens of a black form of the larva of *Abraixas grossulariata*, very different from the ordinary type : they were from Hartlepool, where a colony usually turned

up, but the imagos bred from them were in no respect different from others ; he also showed a very extraordinary variety of *Cymatophora ridens*, and an almost equally interesting *Noctua festiva*, kindly sent to him for figuring by Mr. G. C. Bignell, of Plymouth. The chairman, a very large and curious larva, apparently coleopterous, which had been found burrowing and feeding in the solid wood of a tea chest from China. Mr. E. Hunter, F.C.S., of Goole, sent for distribution amongst the microscopists a quantity of most interesting bat guano. Mr. W. D. Roebuck, of Leeds, presented some papers from the Monthly Microscopical Journal ; votes of thanks were passed for these presentations. The chairman showed Part II. of Owen Wilson's "Larvæ of British Lepidoptera, and their Food Plants." Two papers were read by Dr. J. Spottiswoode Cameron : the first on "Influence of temperature on death rate," which he illustrated with a coloured chart ; the second on "The physiological action of hot dry air on the system."

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Monthly meeting, May 27th, Mr. S. J. Capper, the president, in the chair.—The Rev. H. H. Higgins exhibited his captures of lepidoptera during his voyage with the Argo, and gave an interesting account of the same. Mr. Johnson read a paper on the "Life History of *Leucania littoralis*, with the Larvæ and Imago." The usual *conversazione* then followed, at which several of the members made exhibits—Mr. West, beautifully preserved larvæ of *Dominula*, *salicis*, and *præcox* ; Mr. Johnson, some fine varieties of *Saturnia carpini*.

THE LEEDS NATURALISTS' CLUB AND SCIENTIFIC ASSOCIATION.—289th meeting, May 21st, Mr. John Grassham in the chair.—In addition to the specimens shown by the members of the Entomological Section, Mr. F. Emsley brought *Euglena viridis*, and Mr. W. Barwell Turner exhibited several objects, including *Sphaerozozoma vertebratum* from Rawcliffe ; the germination of spores of *Spirogyra* ; *Batrachospermum* and other fresh-water algae ; and a series of slides of Aphides from various plants.

290TH MEETING, May 28th, vice-president Benjamin Holgate, F.G.S., in the chair.—Paper read by Mr. Benjamin Saynor, entitled "Suggestions for Microscopists."

291ST MEETING, June 4th.—Mr. Henry Pocklington, F.R.M.S., who was in the chair, was elected president in succession to Mr. F. Greenwood, resigned on account of confirmed ill health. A large number of specimens were shown by nine members of the Entomological Section, two of the Microscopical, and exhibitions of the microphone and other physical apparatus by four members of the newly-formed Section for Physical Science, of which Mr. C. H. Bothamley is secretary. Nests and eggs of twenty-four species of birds were shown by Mr. Walter Raine, and a number of beautiful varieties of guillemots' eggs by Mr. John Grassham. A number of other notes were made.

292ND MEETING, June 11th, the president in the chair.—Mr. C. F. Tootal, of Wakefield, showed a new form of microscope by Ross, which possessed several novel and valuable features, notably the Zentmayer moveable stage, sub-stage, and mirror fittings, and a special form of fine adjustment. He also showed some very fine objects, including planorbis shell by polarized light, grouped polycystina, &c., and a beautiful specimen of microscopic ruling in the form of a Lissajou curve ruled on glass. Mr. B. Saynor showed *Volvox globator*, *Polytrichum piliferum*, and *Pilularia globulifera*, from Rawcliffe. Mr. Charles Rider brought the beautiful infusorium *Carchesium polypinum*. Mr. Walter Raine showed a full-grown living specimen of the common ringed snake, from Middleton Wood, Leeds. Insects from Brough, Bishop's Wood, Leeds, &c., were shown by Messrs. Marsh, Roebuck, and Smethurst.—WM. DENISON ROEBUCK, Sec.

OVENDEN NATURALISTS' SOCIETY.—Monthly meeting, May 25th, Mr. C. Sheard in the chair.—The chairman named the botanical specimens collected during the day by Messrs. Cockcroft and Sheard ; they included *Lathraea squamaria*, *Scrophularia vernalis*, *Veronica serpyllifolia*, *Stellaria nemorum*, *Geranium lucidum*, and a great many more. Mr. T. Hirst exhibited the following birds :—Two beautiful cases of foreign birds from Queensland, Australia, each containing twelve birds, one case containing eight birds from America, one case of game, containing pair of red-legged partridge, pair of sand grouse, pair of ptarmigans, one beautiful case of squirrels from America, a variegated blackbird (being black and white), and pair of splendid curlews. Mr. T. Cockcroft exhibited some very good specimens in geology, which were named by Mr. J. Spencer, of Halifax ; there was included a new form of *Ulodendron*, *Cardiocarpon ovalis*, and *C. Butterworthii*, *Goniatites Listeri*, *Orthoceras cinctum*, *O. attenuatus*, *Nucula*, &c. ; also copper ore from North Wales, ammonite and large bivalve fossil shell from Whitby, which were presented to the Society by Mr. W. H. Slater, of Queensbury.—J. OGDEN, Sec.

STAINLAND NATURALISTS' SOCIETY.—Meeting June 3rd, Mr. J. Smith, v.p., in the chair.—Mr. B. Garside exhibited the following birds' eggs :—Carrion crow, rook, and red-backed shrike. A good collection of the local flora was brought in by the members.—W. H. STOTT, Sec.

WAKEFIELD NATURALISTS' SOCIETY.—Meeting June 6th, the president in the chair.—Mr. Taylor exhibited *A. alni* (bred), Mr. Sims, *B. quercus*, var. *callunæ*, *N. camelina*, *P. falcata*, *O. sambucata*, *D. capsicola*, all bred ; Mr. J. Wilcock, species of gallflies, ichneumons, bees, sawflies, and hornet ; Mr. Wrigglesworth, specimens of *Rhagium bifasciatum*, and a variety taken by Mr. Talbot, having the elytra yellow, with a bright red

margin, and a black longitudinal line in centre, with two reddish testaceous bands placed obliquely and several others near the apex. Masters Wormald and Wilcock a quantity of birds' eggs ; Master Marshall, eggs of spotted flycatcher, and white variety of sedge warbler ; Mr. Sims, a new paragon beating tray invented by himself, which was very much admired by the members.—J. W. SHAW, Corr. Sec.

THE YORKSHIRE NATURALISTS' UNION.—The second meeting of 1878 was held at Ilkley, on Saturday, the 25th of May. Various parties having been arranged, and guides provided for each, most of them were carried out in accordance with the programme. One, led by Mr. William West, of Bradford, started from Saltaire at the early hour of 5-35 a.m. Another party, 25 in number, started from the same place at 10-15 a.m., led by Mr. Thomas Tate, of Bradford, whose remarks were directed to the explanation of the geological structure of the country. On the crest of the moorland they were met by a party starting from Ilkley, accompanied by Mr. John Holmes, of Leeds, who had undertaken to explain the "cup-and-ring-marked stones" on the moor. The two parties, now united, proceeded to Sewell's College, where Mr. Holmes lectured on the marks, and showed diagrams of them ; and where afterwards Mr. E. Sewell, M.A., F.G.S., of Ilkley, gave a short address on the "Drift of the Ilkley Basin." A party of about a dozen started from Ilkley at 9 a.m., under the leadership of Mr. H. B. Sewell, in the direction of Beamsley Beacon and Bolton Woods. About 20 visited the woods and domains of Middleton, under the guidance of Mr. William Watson, of Ilkley, leaving Ilkley about 2 p.m. In addition to these, numerous individual explorations were made in various directions. After tea and the sectional meetings, the general meeting assembled at 5-30 p.m., at the Working Men's Hall, the chair being taken by the president, Mr. H. C. Sorby, F.R.S., of Sheffield. Eighteen Societies were represented, and eight entirely absent. The number of members present during the day was considerably over a hundred. The list of new subscribers included Messrs. Atkinson, Spencer, Wright, Fison, and Butterell. It was resolved that a Publication Committee be appointed, to consist of the president and secretaries of the Union and a representative of each Section. The reports of Sections were then given. Entomological Section—Mr. Porritt : Very little had been done, only about 16 species having been taken, and none of any rarity. Geological Section—Mr. Spencer : The Section met at five o'clock, the attendance being by far the largest yet seen in this Section. The chairman, Mr. Thomas Tate, F.G.S., presided. Mr. H. C. Sorby, F.R.S., P.G.S., &c., president of the Union, was also present. The chairman gave a description of the geology of the route from Saltaire to Ilkley across the moor. 1. The lower coal strata of Hope Hill. 2. The rough rock and flag rock of Baildon, and the third grits which compose the area of Rombalds Moor. In the afternoon Mr. Sewell, F.G.S., read a paper on the glacial drift of the Wharfe valley.

Mr. J. Spencer, the secretary, gave an account of his journey from Halifax to Keighley, and *via* Morton Banks to Ilkley, the chief object of which was to get some information about the geological position of the coal bed formerly wrought at Morton Banks. Some years ago he had obtained some very good fossils (*Goniatites reticulatus*) exactly similar to those which occur in the third grits of Wadsworth Moor, near Halifax. The Morton Banks coal bed appears to have been in the third grit (near the base), and at a depth of about 180 feet below the surface of the cannel. This seam of coal appears to have extended over the greater portion of the Millstone grit moors, but with very variable thickness—from a mere trace up to one or two feet. It is said that at Morton Banks it reached a thickness of four feet, but this extreme thickness was most probably merely a “pocket.” Mr. H. B. Sewell exhibited a number of fossils from the neighbourhood, but for the most part badly preserved; a set of glaciated boulders from the district were very interesting: they appear to be all of local origin, and chiefly limestone boulders with ice scratchings. There was one very interesting boulder of black limestone, which was polished as smooth as glass, obtained from Rombalds Moor.

Vertebrate Section—Mr. Lister: About 20 resident birds were noted, among them being garganey, teal, lapwing, marsh-tit, &c. Of the 13 spring migrants the most noteworthy were the lesser whitethroat and ring ouzel, also a nest of the grouse.

Conchological Section—Mr. Taylor: The list of mollusca, though consisting mainly of widely-distributed species, contains three (*Helix rupestris*, *Balea perversa*, and *Clausilia dubia*) with a partiality for places of some elevation. This fact points to the increasing altitude of this neighbourhood, and is of interest as showing the lowest portion of Wharfedale harbouring those species. On the summit of the hills at the head of the dale they are exceedingly common, and apparently diffused throughout North-west Yorkshire on the elevated lands. *Clausilia laminata* and *Helix fusca*, both local species, were found near Addingham. *Zonites glaber* and *Helix sericea* were not uncommon in the immediate vicinity of Ilkley, and several beautiful forms of common species were found, amongst which may be mentioned *Cochlicopa tridens*, var. *crystallina*, *C. lubrica*, var. *lubricoides*, and *Pupa umbilicata*, var. *alba*. The total list contains 22 species and 4 varieties of land shells, some of them being of considerable interest.

Botanical Section—Dr. Parsons: 203 *vasculares* were observed during the day. Bolton Woods had yielded many rarities, as *Trollius europaeus*, *Geranium sylvaticum*, *Lathraea squamaria*, *Paris quadrifolia*, *Crepis paludosa*, *Sesleria coerulea*, and *Equisetum maximum*. Near Farnley grew *Cardamine amara*, *Lactuca muralis*, *Prunus Padus*, *Salix pentandra*, and *Equisetum sylvaticum* (with cones); at Denton, *Myosotis sylvaticus* and *Doronicum Pardalianches*; at Eldwick, *Comarum palustre* and *Ranunculus Lenormandi*; at Skipton, *Geranium lucidum*; and at Cottingley, *G. phænum* and *G. pyrenaicum*. The moorland flora included *Vaccinium Myrtillus*, *V. Vitis-Idaea*, *Empetrum nigrum*, *Eriophorum*, &c. Of escapes from cultivation were found

Aconitum Napellus, Peucedanum Ostruthium, Saxifraga hypnoides, and Nonnea lutea, a weed from the Levant. Mosses were plentiful, with the exception of those of corticolous habit; 84 kinds were observed, among those of less frequent occurrence being Gymnostomum microstomum, Racomitrium aciculare, R. heterostichum, Bryum pallens, Mnium serratum, M. subglobosum, Neckera crispa, Thamnium alopecurum, Climacium dendroides, Hyocomium flagellare, Plagiothecium elegans, Hypnum cordifolium, giganteum, and stramineum. Several rarely fertile kinds were found in fruit, as Hypnum fluitans. The Hepaticæ were 11, and included Scapania nemorosa, Aneura pinnatifida, (?) fr., and Jungermannia barbata, var. attenuata. Sacticolous lichens were plentiful, but corticolous kinds were scarce, as usual in the West Riding. Among the species observed were Evernia furfuracea, Lecanora parella, and Lecidea contigua. The algæ found were Palmogloea macrococca, Glæocapsa polydermatica, and Cladophora glomerata. The fungi included Agaricus umbelliferus and muralis, Trichobasis oblongata, T. linearis, Puccinia adoxæ, and Æcidium valerianacearum. At the general meeting the president remarked the difference between the flora of Wharfedale and that of the gritstone district of South Yorkshire, many limestone plants being found around Ilkley which were not seen in the neighbourhood of Sheffield. This he attributed to the large number of limestone boulders present in the glacial beds, with which, in the lower levels of the Wharfe valley, the millstone grit was covered up.—Mr. C. H. Bothamley, of Leeds, reported the progress made by the Exhibition Committee, and the proceedings closed with a vote of thanks to Messrs. B. Illingworth and Wm. West, of Bradford.

THE THIRD MEETING for 1878 was held at Brough on Whit Monday, 10th June, being the first occasion on which the Union had met outside the West Riding. There was a large muster of members from thirteen of the societies in union, and they were joined by a large number of naturalists from the district—Hull, Beverley, Driffield, &c. The country explored included Brough, Welton, Drewton Vale, North and South Cave, Holme-on-Spalding Moor, Market Weighton, Staddlethorpe, Blacktoft, Broomfleet, &c. After tea and sectional meetings, the general meeting opened at 5-45 p.m. in the large room of the Station Hotel, Brough. In the absence of the president, Mr. E. Hunter, F.C.S., of Goole, was called to the chair. The minutes were taken as read, and the roll being called, exactly half the Societies were found to be totally unrepresented. The represented Societies were, the Huddersfield, Barnsley, Wakefield, Ovenden and Bradford Naturalists' Societies; Leeds Naturalists Club, Goole Scientific Society, York and District Naturalists' Society, Selby Naturalists' Society, Huddersfield Literary and Scientific Society, Huddersfield Scientific Club, Conchological Society (Leeds), and Bradford Scientific Association. The total attendance was over 100. The Driffield Literary and Philosophical Society was admitted into union,

being the first accession from the North and East Ridings. The additional subscribers included Mr. F. A. Bedwell, M.A., F.R.M.S., Mr. T. S. Whitaker, F.Z.S., of Everthorpe Hall, Dr. J. H. Gibson, Hull, Mr. Jas. C. Niven, of the Hull Botanic Garden, Messrs. Ridgway, F.R.A.S., and N. F. Dobraée, of Beverley, Rev. A. Beanland, F.G.S., of Barton-on-Humber, and Messrs. Wm. West and Wm. Nuttall, of Bradford. Dr. A. K. Rollitt, F.R.A.S., president of the Literary and Philosophical Society of Hull, in an able speech proposed a vote of thanks to the local secretary, Dr. Parsons, and to the gentlemen who had given permission to ramble over their estates. The sectional reports were then given as follows :—Geological Section—Mr. Spencer : The section had been well rewarded for their pains. There was an immense quantity of drift in the district, chiefly composed of local rocks, some beds being largely composed of *Gryphaea incurva*. There were also specimens of Kelloway rock and of the celebrated Austin rock. Vertebrate Section—Mr. Lister : Twenty-two resident birds and twelve migrants were noted ; of these the large number of chiff-chaffs was noteworthy, almost equaling the willow warblers at Wentbridge. The rest were as remarkably scarce—as garden warbler, sedge warbler, black-cap. The swallow family (except one swift only) were specially numerous, compared to the scarceness reported in some places. All four were observed in Brough and the soft sandy quarries around. Of quadrupeds, the squirrel, rabbit, and shrew were seen. Conchological Section—Mr. Taylor : Though the number of species collected was larger than at any previous meeting of the year, none were of exceptional interest, all the specimens found being of ordinary species, and exhibiting no very remarkable peculiarities. The list contained 34 species and 3 varieties of land shells, and 12 inhabiting fresh or brackish water : or a total of 46 species and three varieties. The features of most interest were the noticed partiality of *Clausilia laminata* for the trunks of the larch, and the decorticated aspect of all the specimens found. *Hydrobia ventrosa*, a common estuary shell, but new to the Union list, was found in the drains near the Humber by Mr. Whitwam. The only other species needing special mention are *Bithynia Leachii*, *Vertigo edentula*, and *Helix arbustorum*, v. *flavescens*, the last not uncommon near Brantingham. Entomological Section—Mr. Porritt : Amongst lepidoptera the best species taken were *Eupithecia lariciata*, which was beaten freely from larches at Brantingham, and adding another to the comparatively few localities for this insect. A batch of well-grown larvæ of *Eubolia cervinaria* were found on mallow, and those of *Nola cucullatella* and *Diloba cæruleocephala* occurred on the whitethorns. The coleopterists, led by Mr. E. B. Wrigglesworth, had done much better, having noticed about 80 species, including *Dorcus parallelipipedus*, several species of *Elater*, *Blaps senilis*, *Sinodendron cylindricum*, *Rhagium bifasciatum*, &c. On the way to Brough, Messrs. Prest, Bairstow, and Porritt had called at Bishop's Wood, near Selby, and had there noticed about 50 species of lepidoptera in various stages, including

Thecla quercus, Arctia mendica, Eurymene dolabraria, Himera pennaria, Nyssia hispidaria, Tephrosia biundularia, Asthena luteata, Eupisteria heparata, Eupithecia exiguata, Melanthia albicillata (very plentiful), Cidaria silacea (common), Thyatira batis, Cymatophora duplaris, Euclidia mi, Herminea grisealis, Tethea subtusa, Tæniocampa populeti, Cnephasia musculana, Dictyopteryx Conwayana, Grapholitha obtusana, Tinea semifulvella, &c. Mr. S. D. Bairstow was elected the sectional representative on the Publication Committee. Botanical Section—Dr. Parsons : The flowering plants observed during the day were 218, but that number did not adequately represent the floral wealth of the district, some fruitful directions, as the Humber Bank and Walling Fen not having been sufficiently explored. The flora of the neighbourhood of Brough was a characteristic calcareous one, and approached a South of England type. Among the rarer species met with were Carduus eriophorus, the handsomest of our British thistles, a southern plant, not hitherto recorded for the East Riding : Atropa Belladonna, Spiraea Filipendula, Scabiosa columbaria, and Trifolium striatum. A sandy field near Ellerker yielded Papaver Argemone and Anchusa arvensis, and the Humber Bank some maritime species, as Plantago maritima, Scirpus maritimus, and Glaux maritima. In marshes and ponds by the railway at Staddlethorpe were found *Ranunculus hirsutus, Samolus Valerandi, Potamogeton pectinatus P. heterophyllus, *Scirpus Tabernæmontani, and *Carex vesicaria, also Lemna trisulca in flower, a state in which it is rarely found, its propagation being usually effected by buds. The flowers of Lemna trisulca are very small, but the flowering fronds may be easily recognised by the anterior part being bent downwards so that the plant has the appearance of an irregular Maltese cross. The species marked * appear not to have been previously recorded for the East Riding. Twenty-five mosses were noted, the rarest being Ditrichum flexicaule from North Cave and Brantingham Dale. The Hepaticæ presented no special feature. Lichens were abundant as regards individuals, the tree trunks being covered with Parmeliæ, Ramalinæ, &c., to an extent not seen in any part of the West Riding hitherto visited by the Union. About 18 species were observed, including Physcia ciliaris and Parmelia caperata. The Algæ included Rivularia angulosa, Chætophora elegans, Batrachospermum moniliforme, and Navicula cuspidata ; and the Fungi, Peziza trechispora and Æcidium rubellum. Dr. Parsons also exhibited the curious infusorian Ophrydium versatile, allied to Vorticella, which forms large algæ-like masses of green jelly ; it occurred in ponds at Staddlethorpe.—Mr. Hunter remarked that rabbits ate the deadly nightshade with impunity. Dr. Parsons replied that this was so, and was apparently an idiosyncracy peculiar to the rabbit. Experiments had been made with Atropia, the poisonous principle of the deadly nightshade, of which one-eighth of a grain was a fatal dose for a man, and it was found that 17 grains were required to kill a rabbit.—W.M. DENISON ROEBUCK, Sec.

END OF VOL. III.

JAN 1886



Diary.—Meetings of Societies.

- July 2. Leeds Naturalists' Club, &c. Bishop Auckland Naturalists' Club.
Liversedge Naturalists'.
,, 6. Huddersfield Naturalists'.
,, 9. Leeds Naturalists' Club and Scientific Association.—Lecture on
“The British Warblers, (Family *Sylviadæ*,)”—Thomas Lister,
of Barnsley.
,, 10. York and District Naturalists' Field Club.
,, 12. Huddersfield Scientific Club.—Paper on “Bees,”—Rev. G. C. B.
Madden, B.A.
,, 13. Cambridge Entomological Society—Excursion to Ipswich.
,, 16. Leeds Naturalists' Club and Scientific Association.
,, 20. North Staffordshire Naturalists' Field Club—Excursion to Alrewas
and Wychnor, in conjunction with the Burton Club. Cam-
bridge Entomological Society—Excursion to Monk's Wood.
Yorkshire Naturalists' Union—Excursion to Settle, for the
Victoria Cave: Meeting at Town Hall.
,, 22. Huddersfield Naturalists'.
,, 23. Leeds Naturalists' Club, &c.—Paper “On the construction of Maps
in Relief,”—J. Holmes Walker, C.E., of Pudsey.
,, 27. Cambridge Entomological Society.—Excursion to Yarmouth.
,, 29. Lancashire and Cheshire Entomological Society.
,, 30. Leeds Naturalists' Club and Scientific Association.

Books, &c., RECEIVED.—*Midland Naturalist* (June), *American Journal of Microscopy* (May), *Science Gossip* (June).

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will be gladly received by me, and such kindness I will endeavour to
reciprocate.—S. D. Bairstow, Woodland Mount, Huddersfield, May 13th, 1878.

I should be extremely obliged if any lepidopterist, having striking varieties
of any species, would kindly lend them for figuring for publication.—S. L.
Mosley, Primrose Hill, Huddersfield.

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